CONVENTION ISSUE

INFORMATION LETTER

Not for Publication — NATIONAL CANNERS ASSOCIATION — For Members Only

No. 1426 — Washington, D. C. — February 28, 1953

Proceedings of the 46th Annual Convention

The badge of managerial success in the entertainment profession is the sign S.R.O. (Standing Room Only). For the first time in many years, the National Canners Association played to full houses at every one of the 11 public sessions that made up the 46th Annual Convention in Chicago, February 20 to 24. At some of these programs, all geared to the theme, "Sharpening the Tools of Management," it was unfortunately necessary to turn people away at the doors. There was general approval by N.C.A. members of the quality of subject matter selected, of the material presented, of the speakers, and of the manner in which the presentations were made and the meetings handled by the various chairmen. Reproductions of the 38 Convention addresses and statements are published in this issue from pages 38 to 121.

Over-all attendance was estimated by the Chicago Convention Bureau at 20,000, including the 2,300 who attended the National-American Wholesale Grocers Convention immediately preceding the week of activities sponsored by N.C.A., the Canning Machinery & Supplies Association, and the National Food Brokers Association.

Ratzesberger and Willkie Elected

Louis Ratzesberger, Jr., president of the Illinois Canning Company, Hoopeston, Ill., who served as 1952 Vice President, was elected N.C.A. President for 1953, and E. E. Willkie, president of Pacific-American Fisheries, Inc., Bellingham, Wash., was named Vice President. Carlos Campbell continues in office as Executive Secretary and Treasurer. N.C.A. members also elected 25 Directors to new terms, named 3 Directors to fill unexpired terms, and 44 Directors were continued in office.

The official Convention resolutions, presented by Resolutions Committee Chairman Howard T. Cumming and voted at the General Session, February 21, urged that procurement procedures be impressed with maximum conformity to the commercial buying and selling practices normally prevailing in the indus- *(please turn to page 36)*

PRESIDENTS OF THE N.C.A.— *(left to right)*

1952 President Fred C. Heinz, Executive Secretary and Treasurer Carlos Campbell, and 1953 President Louis Ratzesberger, Jr.

Convention Issue

This issue of the INFORMATION LETTER is devoted to the proceedings of the 46th Annual Convention of the National Canners Association.

This 96-page issue compares with the previous record-size 92-page book published in 1949, and was in the mail a week after the close of the Convention.

Statement on Taking Office as President of N.C.A.

By Louis Ratzesberger, Jr.,
1953 President,
National Canners Association

One does not fully appreciate any organization or field of activity until he has devoted some time and effort to its operation. During the past several months I have been privileged to take a more active part in the affairs of our Association. This experience has made me a real enthusiast for N.C.A. objectives and accomplishments. Secretary Campbell and his staff constitute the most efficient and effective organization imaginable. But beyond this, the active interest which so many individual members take in our common problems accounts in large measure for the progress in our industry and the success of N.C.A.

During the past few weeks I have taken a refresher course in canning history, rereading *The Canning Clan* and the *History of the Canning Industry* along with Fred Stare's monumental volume of Wisconsin history. These books paint an impressive picture of our industry and the individuals who played such important roles in its development.

These histories disclosed the fact that my base of operations, Hoopeston, has furnished two N.C.A. Presidents, Charles S. Crary in 1908 and 1909, and Edward F. Trego in 1925. I noted, too, that after his election Mr. Crary moved to Wisconsin. I have no such plans.

While Johnny McGovern once remarked that Fred Heinz had miscalculated in being President in 1952,

LOUIS RATZESBERGER, JR.
1953 President

since he wanted the job in 1957 for advertising purposes, I am well content to be President in 1953 as this year marks the 75th anniversary of the company that I hope will continue to pay my salary while I work for the National Canners Association.

Although I made no campaign, and hence no compaign promises, I will make a post-election promise—to do my utmost to promote the well-being of our Association and the canning industry.

Convention Proceedings

(Concluded from page 35)

try, and registered canning industry approval of immediate enactment of legislation restoring the limited factory inspection authorized by the Federal Food, Drug and Cosmetic Act. (See full set of N.C.A. Resolutions published on page 124.)

New Type of Program

Retiring President Heinz opened Convention proceedings this year with a statement characterizing the "new look" of this year's Production-Management agenda. Mr. Heinz stated that "through the years success of the canning industry has been due in large measure to the development and application of scientific and frequently ingenious production methods, for it is upon the use of such methods that improvement in quality of raw products rests. This high quality must then be retained through the development and application of the most advanced processing techniques, so that the finished products will meet the high standards demanded by the consuming public." Accordingly, he explained that sessions were arranged and programs built to stress the procedures that management must follow to achieve this result.

Two of the speakers on the "Program Preview" session of Friday, February 20, spoke on the "Indispensability of Production-Management Direction"; one—Roy G. Lucks, president of the California Packing Corporation—from the point of view of the large canner; the other—William A. Free, Sr., president of the Hungerford Packing Company—from the point of view of the small canner. This session was concluded with an address by Chief Association Counsel H. Thomas Austern, who reviewed the highlights of government and Association relations through the past two decades of Conventions. The addresses by Messrs. Lucks, Free and Austern appear on pages 47 through 54.

The General Session

Saturday morning, February 21, marked the official opening of the Convention. Capacity of the North Ballroom, augmented by extra chairs around the speakers' platform and an overflow that filled the adjoining North Assembly Room, was completely utilized.

Mr. Heinz presided, and in opening the meeting, reviewed the major accomplishments of the past year—the work of the Association in bringing about final decontrol of canned fruits and vegetables because of their market position well below ceilings; the manner in which efforts to end the steel strike and its threat to canned foods supplies had been made successful; the favorable publicity the industry received in connection with these efforts and other Association projects. Mr. Heinz stressed also the great gains made by the industry in production records and per capita consumption. He pointed up the sound financial condition of the Association and the efficiency of its services.

Dr. Roy C. Newton addressed the session on "Scientific Research—a Builder of Business," citing the food industry as an example of the progress that has been achieved through research. In a century and a half, progress in the production and distribution of food has released 100 million people from the labor of the farm, he said, to devote their energy to other purposes. "A good profitable business is constantly in danger of being completely replaced by a new synthetic product or a cheaper process," Dr. Newton said. "Competition forces research and that is good because it forces improvement."

Taft Receives Ovation

Senator Robert A. Taft of Ohio, making his first public address since the Inauguration, received a standing ovation when he entered the meeting room. In the course of his speech, which he titled, "Freedom—the Key to Progress," Senator Taft expressed his opposition to standby price and wage controls, saying that they "are no part of a free system. They can utterly destroy a free economy. If price and wage controls become a permanent part of our economic system, it means the end of the very progress that will cure the hardships which might result temporarily from high prices."

The Senator's speech was a plea for maintenance and preservation of the spirit of liberty and freedom in which the nation was founded and under which it has achieved the highest living standards of the world. He named

two principal threats to the freedom of this country—the danger of military invasion from Russia and the infiltration of the communist philosophy; and the deprivation of individual liberty that comes from "big government" itself.

Installation of Officers

The Saturday morning session was concluded with the traditional installation ceremonies for newly-elected officers. The nomination slate of officers and directors was read and moved by Henry P. Taylor, Chairman of the Nominations Committee, and after the membership had voted, President Heinz called President-elect Ratzesberger to the platform. Mr. Heinz referred to the President-elect as a "sterling character, a man of conscience, ability and keen judgment. He served notably as your Vice President all last year and previously turned in an outstanding performance as Chairman of the N.C.A. War Mobilization Committee. You gentlemen have made an excellent choice for your leader in 1953."

Following his brief remarks of acceptance of the gavel of office, Mr. Ratzesberger took the chair and recognized E. N. Richmond, of the Richmond-Chase Company, San Jose, Calif., who came forward to honor Mr. Heinz with a graceful and appreciative eulogy of his valuable contribution to Association and industry achievement (see page 39). Mr. Richmond, on behalf of the Association, then presented Mr. Heinz with a pair of silver candelabra, as a token of the universal feeling of affection and admiration on the part of the membership.

CARLOS CAMPBELL
Executive Secretary and Treasurer

Production-Management Programs

That afternoon began a continuous series of special conferences at which the various production and management problems of the industry were discussed. The first of these dealt with processing methods and equipment, and was co-sponsored by the N.C.A. Laboratories and the Canning Machinery & Supplies Association, with C. E. Maier of the Research Department of Continental Can Company presiding. Simultaneously, in another meeting room, under sponsorship of the N.C.A. Raw Products Committee, a special session was being held for discussions of the subject of procurement and management of raw products, with Chairman W. Stanley Macklem presiding.

All day Sunday was devoted to various aspects of quality protection and food regulation with morning discussions under the direction of the N.C.A. Raw Products Bureau (discussion leaders were F. C. Bishopp of the USDA and Ray B. Wakefield, Chairman of the N.C.A. Eastern Technical Committee on Baby Foods), and afternoon sessions directed by the N.C.A. Laboratories. C. L. Rumberger, Chairman of the Washington Laboratory Advisory Committee, presided.

Monday morning again found two technical sessions in progress, one sponsored by the N.C.A. Raw Products Research Bureau, with Director C. H. Mahoney as chairman, covering field management problems; the other by the Laboratories on container and other production problems, with B. S. Clark, Research and Technical Department of American Can Company, presiding.

This year's Convention introduced a new type of session dealing with management controls, the new techniques of statistics, and effective use of cost accounting. This session was handled by the N.C.A. Division of Statistics, with Director H. L. Stier presiding, and attracted good attendance and interest.

On the final program day, Tuesday, February 24, the N.C.A. Procurement Committee, with its chairman, Alfred J. Stokely, as presiding officer, presented a special program on military procurement. Speakers were procurement officers from the Washington Office of the Quartermaster General and following their remarks (reproduced on pages 111 through 115), questions from the floor developed the information that the Defense Department again has requested the Department of Labor this year to waive Walsh-Healey Act stipulations. The Defense Department also requested the Department of Agriculture to issue set-aside orders. If the Walsh-Healey exemption is obtained and the

E. E. WILLKIE
1953 Vice President

set-aside orders are issued, the Quartermaster General will again offer canners the letter contract method of selling merchandise.

Tentative requirements of canned fruits and vegetables from the 1953 pack to meet the needs of the armed forces were announced by the Department of Defense simultaneously in Washington and at the Convention on February 23 (see page 115).

The final Convention session was the Fishery Products Conference on Tuesday afternoon, February 24, with Milroy Warren, Chairman of the N.C.A. Fishery Products Committee, as presiding officer. The conference opened with discussion of an important current topic—the United States reciprocal trade agreement policy, of immediate and direct concern to the fish canning industry but also involving other segments of canning. Among other topics at this conference were legislation affecting the fish industry and the marketing of canned fishery products.

N.F.B.A. and C.M.&S.A. Meetings

During the full period of N.C.A. sessions, the two other co-sponsor groups of the Annual Convention were in session. The National Food Brokers Association held its annual meeting all day Saturday, February 21, and thereafter its members were keeping appointments with their principals. The Canning Machinery & Supplies Association held its annual meeting Sunday morning, February 22, and conducted its annual exhibit of machinery and supplies daily, Saturday, February 21, through Wednesday, February 25, in the Exhibit Halls and Ballroom area of The Conrad Hilton.

GENERAL SESSION

Address of the President of N.C.A.

By Fred C. Heinz,
1952 President,
National Canners Association

A little over a year ago you paid me the great honor of asking me to serve as the President of this Association. Since that time I have put in several thousands of hours and traveled many thousands of miles on behalf of the interests of our organization. It has been a busy year—and an experience I would not have missed for anything.

One result of my experience is that I can look into this audience and see a great many people who are now my warm personal friends and whom I hardly knew at this time last year. For a man who has been in this business more than 36 years it came as quite a surprise to me to learn how many of my fellow N.C.A.'ers I had never met.

That has been the most satisfying feature of this experience, the opportunity to meet so many wonderful people in our industry. The enduring friendships we have made are among the most important things we take away from this job.

When I say "we," I include Mrs. Heinz, too, for she has traveled many a mile with me in these past 12 months, and I know that she appreciates as much as I do the hospitality with which we met every place we visited.

Now let me tell you what the Association has accomplished under its outgoing administration. The brightest news I have to report is that we enjoyed what may have been the only balanced budget in Washington last year.

We started the year with a budget of $1,133,000. Of this sum only $1,058,000 was spent. Receipts exceeded both budget and actual expenditures. To put it briefly, we spent *less* than we were expected to spend, and we took in *more* than we were expected to spend. As a result N.C.A. wound up the year's operations with a surplus of $123,000.

How did we spend our money? A good deal of it went to the maintenance of our permanent staff of expert scientific and technical personnel. As President of N.C.A. I got a view of the activities of these people that I had never been able to get before, and I can assure you that they represent one of the best investments we make. Aside from the day-in-and-day-out work that they do in our behalf, they are valuable to us because they help to establish and preserve our status as an association that is truly representative of its members.

This means that the government officials with whom we deal—and that includes all branches of government—have the greatest respect for the staff of N.C.A. It is that respect that enables the staff to represent the industry effectively on the many problems that arise.

The result is that we are always well represented whenever government considers the enactment or enforcement of regulations important to us. It means that we have a friend in court when our case comes to trial.

An outstanding example of our friendly relations with government agencies lies in our dealings with the Food and Drug Administration. The specialists in the Food and Drug Administration have high regard for their fellow specialists in N.C.A.'s laboratory. They admire them as much for their integrity as for their ability. The result is that the most controversial issues are handled in an atmosphere of friendly understanding.

More or less, this is the atmosphere that characterizes N.C.A.'s dealings with all government agencies. And it is directly traceable to the simple policy of having a permanent staff of people who know what they are talking about.

We had a lot of headaches during 1952, which we classified in two categories: routine headaches and unscheduled headaches. The routine headaches were taken care of by the old standard medicine: an alert staff working hard at every opportunity. The unscheduled headaches required special medicine.

There were two of them. One was the job of carrying out the Association's resolution calling for suspension of price controls.

Now you would have thought that it would be obvious that an industry that had priced most of its products well below the ceiling price would not have to be harassed with the burden of price control. Unfortunately, though, the bureaucrat's mind doesn't always follow the shortest distance between two points. Ellis Arnall, in particular, proved to be practically immune to logical argument.

We did the only thing we could do, which was to keep the reasonableness of our case before the public and before the Congress which represented it. I remember Henry P. Taylor going before the Senate Committee on Banking and Currency last March, and what an excellent presentation he gave there. He had more charts and graphs than a textbook on economics, and they all pointed to one thing: that keeping price controls on canned foods was about as useless and annoying as putting a muzzle on a caged rabbit.

We finally succeeded in making our voices heard above the clamor. Controls came off. And what was the result? I have not seen any headlines about the spiraling cost of canned foods. No, canned foods remain the housewife's best buy for her food dollar, and we have been successful in having the industry relieved of a bookkeeping burden that could only add to the cost of the product, instead of holding it down.

The other unscheduled headache was the steel strike, which threatened to create a serious tin can shortage. In this we were successful in proving to the government that food is a strategic material that needs to be stockpiled. If the strike were prolonged, losses to farmers would be tragic and the widespread impact on the nation's food supply would be a great irretrievable loss. As a result there was very little interference to the operations of the canning industry.

In both of these instances, the fight for price decontrol and the fight to retain tin plate supplies, N.C.A. operated like the smooth-functioning piece of machinery that it is. Members of the Association's various committees spent many long hours in Washington working unselfishly in the interest of the industry. The State Secretaries kept vital information pouring in and did what they could to promote our cause in their own local areas. The officers and staff of the Association coordinated all this material and all this effort and applied it where it would do the most good, with notable success.

It has been a real experience for me to watch the Association go into action at times like these, because I would not have believed that so much could be accomplished by so many people working on the same problem. We hear a lot about the effectiveness of cooperation. Let me tell you that it works.

It would be nice to be able to report that the year 1952 saw the permanent solution of all the problems that have ever faced or ever will face the canning industry. But the job of the National Canners Association is not completed nor do I suppose it ever will be as long as there are problems arising within the industry that can be handled through cooperative effort.

Unfortunately the supply of headaches always seems to keep pace with the supply of heads. I predict there will be no shortage of problems next year, five years from now, or 50 years from now. We may have other shortages, but that won't be one of them. And I predict, too, that the way we will solve these problems is the same

way we solve them today—by intelligent cooperation through our national association.

Where do we stand today? The canning industry has made tremendous progress during the past quarter-century, in terms of both quantity and quality.

During this period it has taken on a major part of the burden of feeding our armed forces at home and abroad, in addition to feeding the soldiers and civilians of other lands. All this it has done without any disruption of the regular domestic supply.

To accomplish this the canning industry has had to expand its production of the old-line items enormously and has added many new products in big volume, and it has had to maintain and improve its already high standards of quality in order to keep the market for its new productive capacity.

Since the beginning of World War II production of canned fruits and vegetables has increased by more than 50 percent, from 304 million cases to 470 million cases. The canning industry kept pace with a population that was growing by 25 million consumers in that period. It did better than keep pace, and that is shown by the fact that per capita consumption of canned vegetables jumped from 38.7 pounds in 1940 to 49.4 pounds in 1952. Per capita consumption of canned fruit and fruit juices went up from 29 pounds in 1940 to 38.2 pounds in 1952.

For all canned fruits, juices and vegetables consumption per person is now about one-third larger than it was in 1940.

What has caused this increase? There are a number of factors. One that is pointed to most often is the increase in purchasing power of the American consumer. This is undoubtedly a factor. Nevertheless, consumption of canned foods has gone up even faster than consumption of most other foods, so there must be another factor involved.

I believe the answer is that the producers of canned foods, by improving their efficiency all along the line, and in a true competitive spirit, have kept their prices comparatively low. A graph of canned food prices and overall food prices for the past ten years shows a steadily increasing gap between the two.

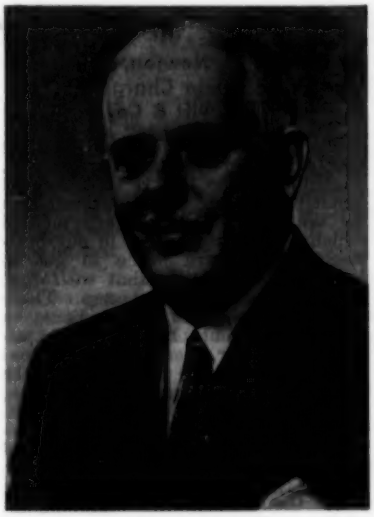
The problem that faces us all in 1953, and in the years to come, is how long we can keep widening that gap. It has taken every ounce of managerial skill for this industry to keep its prices down when all its costs were going up. Wage rates alone have tripled since prewar. Raw product costs have gone up almost as much.

These are the most competitive times we have ever known. If we are to continue to grow there is only one solution for us: that is to exercise our managerial wits more strongly than we ever have before. We will not find the way out through higher prices, that is certain. Our profits are going to have to come out of our own ingenuity.

And now, let me close with thanks for all those who have made my job a lot easier in the past year than it would have been otherwise. In particular I am indebted to all the staff, and especially to Carlos; to all the committees, the Administrative Council, and the Board of Directors; and to our legal counselor. Above all, I am indebted to the membership of this Association, whose ethical conduct in the day-to-day operation of their individual businesses across the country makes this the great organization that it is, and that has given our industry the excellent reputation it enjoys.

I hope my successor will meet with the same splendid cooperation I found from all of you. I know that he will deserve it well.

Thank you.



FRED C. HEINZ
1952 President

Presentation of Gift to President Heinz

By E. N. Richmond,
Richmond-Chase Company

I consider it an honor to have been selected as the person to say a few words in appreciation of the services of our outgoing President and to make the presentation of a gift to him in behalf of our membership as a token of our feelings of affection and admiration for him and for the excellent services that he has rendered to the national canning industry during the past year.

Fred Heinz has been the right President at the right time for the National Canners Association. No man within our ranks was better qualified to have served as President during the past year. He had the thorough knowledge of the problems of the canning industry accumulated during the many years past through having served on the more important committees of our Association.

Within the past four years our organization has financed and built new office and laboratory buildings in Washington and Berkeley. Financing the project was accomplished from funds set aside from our own general fund and from a fund raised from suppliers and friends.

Fred Heinz was chairman of the financial committee and did personally accomplish a large portion of the solicitation of the funds raised by his committee. He was in a large measure responsible for the financial success of the building project.

Fred, during his tenure of office, has made almost a full-time job of the presidency. Results of the past year indicate his success. Problems have been many, and travel has been much, but no problem has been too tough or travel too distant to dim Fred's desire for accomplishments for the national canning industry.

Fred, your tenure of office has been so successful as to cause you to be rated as one of the outstanding Presidents who have served the National Canners Association since its inception.

The staff desires me to express to you their appreciation of your helpfulness to them and consideration for them. From the bottom of our hearts we all of us say to you "Thank you."

We thank your company, the H. J. Heinz Company, for their consideration of having granted to you so much of your time to serve the interests of the National Canners Association.

The gift which we have for you is of small intrinsic value, but we trust that the value of the sentiment it represents will cause the candles of the candelabra to burn brightly for you and your good wife and to remind you often of our kindly sentiment for you.

Scientific Research—A Builder of Business

**By Dr. Roy C. Newton,
Vice President in Charge
of Research, Swift & Co.**

My place on this program today is that of a chronicler of progress and, particularly, the factors that brought about this progress. As business men we are all interested in any method which promises progress in our business, but we are prone to get so tangled up in details that we forget our basic formula for success. There are, of course, many ingredients in this basic formula, but I shall not attempt to cover them all with equal emphasis. No one can discount the importance of honesty in business, quality of product, service to the public, economy of production, or advertising and promotion of sales. Good business men always think of these things, but sometimes they forget about the research that underlies all of them. Therefore, my remarks will be directed at research and development as the builder of business.

In a thriving business one might ask the question, "Why research?"

It is an unusual question in 1953, because science and scientific research have become common to the vocabulary of every household. It would have been an unusual question 50 years ago because the term then would have been unknown in most households. Such is the change in half a century. But there have been other changes during the half century. For example, there were horse cars on the streets of Chicago in 1900. The kerosene lamp supplied the lights for our homes. The average work week was something like 60 hours. The life expectancy of a new-born babe was 40 years.

The causes of many diseases were unknown. The measure of a diet was limited to calories, protein, carbohydrates and fats. Our homes had no telephones, radios or electric appliances; and our women had no nylon stockings.

The agricultural art was such that it required over half our population to supply our wants for food and fiber. Many things which we consider as necessities today were either unknown or unattainable to the common man as we started on the 20th century.

There was one invention of the human mind, however, that was slowly being put to work for the enlightenment of mankind. This invention had been in the process of development for many centuries and was gradually picking up momentum as more and more of our people adopted it. It was so simple that most of the prophets and historians of the day failed to recognize it. That invention was the "method of scientific research." It is true that the method had been known by a few of the earlier scientists centuries before; but not until the nineteenth century had it been firmly established within a social structure which nurtured its development.

Perhaps we should pause here just long enough to examine this thing we call the "scientific method."

There are three features of the "scientific method" which differentiate it from the older philosophies.

First, it depends only on knowledge that can be observed over and over again by anyone who wishes. Nature is impartial and will reveal her secrets to anyone. Socrates taught his pupils what he considered to be the great fundamental truths and then taught the method of deduction. By this procedure it was possible for anyone to determine from the general principle, by simple deduction, the answer to any specific question. If the generalizations were wrong, then the specific answers were sure to be wrong.

Now, remember, science depends only upon that knowledge which can be supported by reproducible observations.

The next step in the "scientific method" is to correlate these observations until they clearly describe the general law. This is known as inductive reasoning. Man's progress will depend on the number of people who learn to use this method and to throw off their superstitions and prejudices. Unfortunately, even our greatest scientists seem to forsake this training when considering questions outside their own field of learning, thus falling under the spell of emotionalism and prejudice.

The third important step in the "method of science" is the design of experiments which force Nature to reveal her secrets. The life span of man is not long enough to wait for the accidental occurrence of natural phenomena so that scientific observations can be made. It is necessary to induce these phenomena by setting up the proper conditions and then observing what happens. This procedure begets the highest form of honesty because the reported results are subject to check by other scientists. It is a situation in which no man's word needs to be taken on faith and no man's opinion is better than that of any other unless it is supported by reproducible experiments. Fundamentally, this is all there is to science. It seems so simple that we wonder how charlatans can prey on the inability of people to think.

Perhaps some further introductory consideration should be given to the factors which have allowed this method to perform such miracles and at such an accelerated rate during the past 100 years, and, particularly, during the past 50 years, whereas it progressed so slowly at first.

In the first place, there were only a very few people who could throw off the superstitions of their childhood so that they could embrace the method. Of these few, only a very small percentage had the courage to defy the word of the master minds who were supposed to do the thinking.

In the second place, it was necessary in the beginning to build up slowly and painstakingly sufficient data from which to enunciate the more fundamental laws and to get a picture of the structure of matter and the behavior of matter and energy. It is always these fundamental concepts which, after adequate proof, form the thinking raw material for newer concepts and their use.

In the third place, it requires freedom of the individual not only from restriction and from prejudices in thinking, but also freedom of the individual to choose his activity and the environment in which to carry on this activity.

The fourth element in the use of this method is that of inducement. For the scientific method to yield usable results it was necessary to provide inducement or incentive. Man's curiosity has been responsible for his effort to push back the curtain of ignorance; but the right of ownership has been the incentive which has caused him to use this new-found knowledge. At first this resulted in secrecy. Each inventor tried to keep his process or formula a closely-guarded secret. When science reached the point that inventions could be analyzed and duplicated, it led to the system of patents in which the government contracted to guarantee ownership for a stipulated period in exchange for a written description of the invention.

Basic research depends on natural curiosity with personal support, while applied research depends on incentive. Both require freedom. It is precisely this freedom and incentive that have been provided in this country to a greater extent than anywhere else in the world during the past half century. It is true that in the past some other nations have given better financial support to fundamental and exploratory research than we have in America. It is true, also, that we have taken the recorded and tabulated knowledge from others and applied it to our use with so-called Yankee ingenuity. In other words, we had freedom and incentive to a greater degree than we had the good sense to provide financial support for basic research. As a result, for many years we have led the world in applied research using the knowledge supplied by others. Now we have of necessity taken the lead in fundamental research in many scientific fields.

That, in brief, is a description of science, how it works and the factors which favor its development.

Now we come to the question, "Why research?"

If this tool of the human brain has given us so much in better living, less drudgery, better health, better food and a more uniform supply of food, as well as all the luxuries, why shouldn't we be satisfied?

The answer is that we have only just begun. There are more natural phenomena yet to discover than have thus far been written into the text books.

It would serve no good purpose for me to list the achievements of research. They are too numerous and too important in our lives to have been unknown to any of us.

You may be sure that insufficient knowledge is the ultimate barrier in the path of progress in every sphere of human endeavor. Whether it be physical comforts, better health, better food or better human relations, we are circumscribed only by our inability to understand the natural laws that govern these things. We must do research to bring forth this understanding.

Industrial research, if it is to grow and continue to be increasingly profitable, must take the facts from the various branches of science and fit them together to get a positive answer. In fundamental research a negative answer is sometimes as valuable as a positive, but in industrial research the thing must work or it is no good. To get this positive answer, the man in industry must have the fundamental knowledge which can best be learned in an institution with greater freedom from the pressure of practical problems.

I believe research in the industrial laboratories will be intensified to the end that more attention will be given to seeking fundamental information. Industrial research has a habit of selling itself. Once it is well started in an industry, competition forces it at an accelerating rate up to the point of diminishing returns as compared to cost.

The chemical industry in this country is now the largest and most capable of any chemical industry that ever existed in any country. All of this has been built since World War I and the speed with which this development has been accomplished comes from several factors:

(1) There was an accumulation of basic information in the scientific literature built up largely in the universities over a period of years.

(2) Business leaders expressed confidence in research by giving financial support to their own company laboratories.

(3) The research laboratories in the chemical industry continued with the accumulation of basic data as well as their regular operation of applied research.

The development of the chemical industry is perhaps our best illustration that scientific research is a builder of industry.

If research is a builder of industry, it is also a wrecker of industry when the other fellow is doing the research.

Scientific research is moving so fast that new competitors are produced almost overnight. A good profitable business is constantly in danger of being completely replaced by a new synthetic product or by a cheaper process.

A point that is often missed is that two levels of competition are affected by research. The first is between companies within an industry, and the second is between industries.

I am reminded of a visit I had some years ago with the president of the Bell Telephone Laboratories. In a discussion of problem selection, he stated that Bell Telephone felt it must anticipate the next moves of its competition. This surprised me and I volunteered that Bell Telephone really had no competition. My attention was called to the telegraph companies, messenger service, and the postal service, as well as personal contacts, such as a young man going to see his girl. These are truly all competitive with the telephone and as you can readily see as in the case of the young man visiting his girl, each has some feature that is difficult to attain with the telephone.

The meat packing industry has a long history of research. Our industry was, in fact, a leading exponent of research before science was popularized with the public. Much of the study and experimental work carried on in the early history of the meat industry had to proceed without the aid of highly trained scientific workers. The changes that took place in the latter part of the 19th and early 20th century in the handling, processing, and distribution of meat foods represent progress that will be difficult for the present or any future group of research workers to equal.

The people who made these advances worked with principles and objectives which are inherent in any successful research program and are worthy of re-evaluation by those of us who now have the responsibility. In the first place, these men had an economic objective. They foresaw the possibilities of performing a public service in furnishing food to populations far removed from the area of heavy livestock production and they knew that the free enterprise system would return a profit to those who efficiently performed this public service. Secondly, they possessed the courage to break with established precedent. The progress in establishing this industry with the efficiency of operations for which it is still famous, and the utilization of byproducts for which it has been famous, is profound evidence that these men could do a fairly good job without much scientific training. They didn't use the same terminology and probably didn't accept the broad use of the word "research" as *we do*, but they were doing research just the same. Anyone who is engaged in trying to find a better way is doing applied research regardless of what job he may hold.

It is a mistaken idea to think that we emulate the founders of our business by carrying on our operations as they did a half century ago. The fact is that our predecessors were characterized by their efforts to improve and if we would follow their example we must organize to do an intelligent job of making steady improvements in our methods. The founder of Swift & Company had a principle which applies: He said, "The best a man ever did shouldn't be his yardstick for the rest of his life." That is a working rule that applies to organizations as well as to individuals.

When I was a small boy, there were 75 million people in these United States and about half of them were associated with agricultural work on the farm. This, however, was a tremendous improvement over the situation which existed a century earlier when 79 percent were so engaged. There are other lands, even today, in which it takes 80 percent of the people at hard, back-breaking work to produce the food and fiber needed for themselves and the few others performing services and engaged in industry.

In 1800, 79 percent of the people in agriculture; in 1952 only 14 percent.

What brought this about and what does it mean to our mode of life?

It means that we have released 100 million people from the labor of the farm so that children can continue in school, and workers are available for producing in industry the many things we consider necessities today but would have been unheard of luxuries a generation ago. It means we have available the trained personnel for the professions, as well as the services, such as, mechanics, storekeepers, and postal clerks.

It means we have the leisure to pursue the search of knowledge in the sciences and arts.

Without this supply of workers for industry, imagine if you can the things we would not have. I shall not enumerate them for it would bore you, but I cannot refrain from drawing the obvious conclusion that it was necessary to liberate man from the incessant struggle for food, before we could progress to these other things.

How can we evaluate the events from the colonial days with four men

out of five working long days to eke out the coarse homespun existence up to the present, when five out of six are available for other work? The inventive genius of the equipment manufacturers has contributed enormously to the increased efficiency of farm production, but this mechanical ingenuity could not have gone far without its companions of applied and fundamental science. Where would the modern equipment manufacturer be, for example, without the materials available to him now that were unknown even 50 years ago?

Nor is equipment improvement by any means the most spectacular contributor to this liberation of man from the constant quest of the necessities. Plant breeders have produced miracles of increased production of those crops which supply our needs. There is not a crop in American agriculture today that has not been improved in quality, yield or increased resistance to disease through the arduous and painstaking efforts of plant geneticists. There is no end to future progress as long as science is our tool and guide, and as long as society provides the environment for a free competitive enterprise.

Are we in fact increasing this support of agricultural research? I have seen recently a pamphlet entitled, "Applied Research in the United States." It is a report of the National Research Council to the Mutual Security Agency. On page 17, there is a table comparing federal expenditure for research in various phases of our national life. In 1940 the expenditure for agricultural research was $28.4 million as against a total of $73.4 million for all research. In 1950, we spent through our federal government for agricultural research $50.6 million; but the value of the dollar is worth only about one-half what it was in 1940, so, in effect, we were in 1950 actually spending less for agricultural research than we were in 1940. On the other hand, our total federal expenditure for research has increased from $73.4 million in 1940 to $1,888,900,000 in 1950.

I do not stand before you to recommend more government spending, but rather for a more rational distribution of our research expenditure. If my thesis is correct that agricultural research has been so productive of public good, is it not then good policy to augment this activity?

There are several great avenues of research, each acting as a supporting influence to the others. According to my classification these are:

(1) Privately endowed institutions and universities.

(2) State universities and experimental stations.

(3) Federal government research laboratories and experiment stations.

(4) Industrial research laboratories.

One important point should be kept in mind in the consideration of these principal research agencies. I have mentioned the absolute necessity for freedom if scientific research is to be productive. This means freedom for the individual scientist to think, to experiment and to report his findings. It also means the freedom to select the field of his own interest in which to apply his talents. For half a century while science was making this the greatest nation on earth, this freedom was a foundation philosophy. Scientists chose either industry or the university. If in the university, he chose his field of interest. Then things began to change. Taxes dried up the source of new funds for endowed universities and higher costs

ROY C. NEWTON

forced the universities and the research workers to divert interests into channels where government funds were available. To be sure we did things on a grandiose scale, but will this new system which is directed from above bring out the individual genius so necessary for the great advances of science?

A more or less casual look at this distribution of research effort gives an altogether erroneous picture. Actually, the higher costs and higher taxes have dried up the support of the privately endowed institution and, to a certain extent, the state institutions making them more dependent on the federal government for funds. It is an inevitable consequence of such centralized control of the purse strings that the individual scientist will lose his freedom to select his field of work. If he cannot get money to do what he wants to do, he will naturally gravitate into those fields where funds are available.

It has long been my opinion that industry has a responsibility to see that big government does not usurp the guardianship of fundamental scientific research.

Now, I have spoken of the power of this instrument of the human mind which we call the scientific method. I have briefed for you basic principles that make this method work and I have outlined the various agencies that are organized to use it for the betterment of man. How does this affect us as individual business men?

There is no doubt but that applied research will progress and expand as rapidly as the fundamental truths are provided. This does not mean that each industrial company, nor each branch of industry, will equally profit by research. There will be many companies who will fail to see the opportunities—but they will be unnoticed as they quickly pass out of existence. I said a few minutes ago that scientific research is a builder of industry and business and that it is also a destroyer of industry. For example, this audience is principally interested in the preservation of food by the involved process of sealing the food in a tin can and then heating it to destroy the bacteria and the enzymes. It has been a successful and a growing business for nearly a century. The plain and simple reason for that success is that it performed a useful service. Does that mean that its success will continue? It seems to me the answer is "no," or, at least, only "maybe." It may well be that in 25 years there will be revolutionary changes in the canned food industry.

On the way from Chicago to my farm home in Michigan there is a little town that was once famous. In this town was a thriving business based on a patented machine for splitting turkey quills and binding them into strips for corset stays. Where is that business today?

What would happen to the pea canning business if someone could make a superior and a cheaper product put up in a way that eliminated the use of a can opener?

I suppose it is no secret to you people that no canned product tastes precisely the same as the fresh product. To be sure, some items have a better flavor than the fresh, but some do not. Now, what would happen, for example, if a dehydrated product captures this elusive flavor, texture, and eating quality associated with garden freshness? We might see an entire industry fold up. But let us not suppose anything quite so drastic. Let us just suppose that your competitor, the one sitting next to you—the one who recently set up that research department—suddenly finds the secret of a superior canned prod-

uct. I don't need to tell you that such discoveries properly exploited can make a small company big and a big company non-existent.

What I am trying to say is that competition forces research, and that is good because it forces improvement.

Many of you will say, "What can I do? My little company can't support a big expensive research program." Let me tell you there are a lot of things you can do without a large staff of chemists and physicists with Ph.D. degrees.

The spirit of fundamental research is the desire for knowledge and the spirit of applied research is the desire for improvement.

The company which instills into its management and key employees the desire for knowledge and improvement will be mighty hard to crowd out of the business world.

The sources of knowledge are open to all and the creative mind fortunately is not limited to those with a college degree. To be sure, if you are organizing a department of research you will staff it with people who are trained in science but you will also make every attempt to keep posted on new developments in other industries, in universities, and by the scientists in your own National Canners Association Research Laboratory.

I should like to quote from a recent talk of L. L. Colbert, president of the Chrysler Corporation. He said:

"This way to increased productivity through improved machines is the way to meet the expanding requirements of a rapidly increasing national population. Each year it is going up by about two and a quarter million persons, and that's like adding a state each year with the population of Iowa.

"We have taken today only a glimpse of what productivity has meant to our nation in the past and what its continued improvement can mean for our future. But we know from the experience of others what can happen to a country when it fails to keep up with the productivity parade. The penalty of technological obsolescence and industrial short sightedness is a heavy one.

"After the war the British re-equipped many of their plants with machines and tools taken from Germany under terms of the reparation treaty. They were good tools but already they were about 10 years behind the times. The Germans, forced to start from scratch, have equipped their own war-damaged factories with the latest type tools. Today Germany, a conquered nation of World War II, is once more out-producing England."

The task of industrial management is large and demands many specialized abilities. One of these is the ability to instill into the minds of their subordinates the spirit of research—the desire for improvement.

Freedom—The Key to Progress

By The Honorable
Robert A. Taft
U. S. Senator from Ohio

It is always a pleasure to come to Chicago, where I have so many friends, and have an opportunity to thank all of them for the support which they have given me in various elections, and in Congress. This is the first speech I have made, because I came to the conclusion that the country had had its fill of Taft speeches during the past three or four years. But your officers were so persuasive that I could not decline this opportunity of meeting the greatest association of small business men in the United States. You have a wonderful Association. Your people are close to the farmer and agricultural opinion, they are close to the consumer. They are a good cross section of the opinion of the entire country. They believe in that liberty which is the subject of my speech today, as so well set forth yesterday by Mr. Austern.

We have had an interesting time in Washington since New Year's Day, but we have not yet even completed the organization period. It is too soon to talk in detail of the issues that have arisen, because the program of the Administration, both executive and legislative, is still in process of formation. Few realize the extraordinary difficulty of the job to be done in taking over a government with more than two and a half million employees, many of whom have come to think in a manner contrary to what I happen to believe, or small business men believe. The government is ten times the size of 1933, the last time there was a fundamental change of control. But the Eisenhower Administration has taken hold of the problem and it is approaching with courage and determination the tremendous job of cutting down the size and power of this sprawling federal government.

Today, therefore, I do not intend to talk about any particular program, but rather of the philosophy which I believe should guide the Republican Party—and the Democratic Party for that matter. The newspapers and others are too much inclined to classify every man and every party as either radical or conservative. They try to judge every issue on the basis of whether one's position is "left" or "right." They are surprised at the man who has received a left-wing aspect in the press when he perhaps supports a conservative measure, and they are surprised when those who are tagged as reactionaries turn out in many fields to be more progressive than their opponents. As a matter of fact, the questions that we face today are often questions which require primarily the application of wisdom, practical judgment and good sense, and above all a knowledge of government and a fundamental belief in the purposes for which the American government was founded. As far as many policies are concerned, I could argue on either side of most of the policy questions of the day. At least I can see the arguments for them and against them. But the true liberal should have some guiding principles, be he conservative or radical.

In seeking a guiding principle, I have come more and more to believe that the consideration which ought to determine almost every decision of policy today is the necessity of preserving, maintaining and increasing the liberty of the people of our country. Every policy should be tested on that touchstone, whether it increases or decreases the liberty of our people and the promise of continued liberty in the future.

All of us have given lip service to the principle of liberty since we were small children. But the truth is that after praising liberty, there are very few people who pay very much attention to the application of the principles of freedom, or study the conflicts of the freedoms of various groups.

This country was founded to obtain the independence of our own people, and for many years our citizens talked so much about liberty and the new era that they had brought to the world, that they bored the foreign travelers—even those who were sympathetic.

Tomorrow we celebrate the birthday of George Washington, who, more than any other man, was responsible for the successful establishment of the independence of the United States. The nation which he founded was, as Abraham Lincoln said, "conceived in liberty." Those who founded the nation knew of the dangers which might destroy any free state. It was Benjamin Franklin who said that we had established a republic if we could keep it so, and who said further that "they that can give up essential liberty to obtain a little temporary safety deserve neither liberty nor safety." The liberty established by the new American government spread via the French Revolution to all sections of the world until it was an accepted philosophy in most countries that the best way in which people could hope for progress and a happy life was to have a free government. The philosophy was accepted even in countries where they did not in fact have liberty.

Then gradually a new theory arose that people's welfare and the happiness of their future could be achieved only by turning over all power to the state, that the people were not able to do the planning for themselves, and that only the government had the ability to plan and the power to carry out the plans necessary for the people's improvement whether the people liked the plans or not. While they

give lip service to liberty, many people in this country today accept a philosophy of government which is completely inconsistent with liberty.

What is this liberty, and what has it done? First, of course, we understand it clearly to include national independence. We know that the American people desire to be free from the direction or votes of millions of other people. The American people certainly are not going to let the rest of the world take over this country and boss them. They are determined that they will resist any threat to their liberty through the growth of a great communist state based on the Eurasian mainland.

But the very independence we are trying to protect may be destroyed by perpetual war, which has established many dictatorships in this century. It may be destroyed by expenditure so great as to turn this country into a garrison state in time of peace. In other words, there are always conflicting dangers to liberty. We have to pursue the course which will retain essential independence. On the one hand, we can agree to various limitations on our sovereignty which do not really endanger it by entering into international agreements like the United Nations Charter and military alliances binding us perhaps to go to war in certain cases as a preventive of a more dangerous war. But I believe we would threaten the very essentials of liberty if we joined a world state with an international legislature making laws for the people of the United States. It is obvious if we have only 6 percent of the population of the world that on any basis of fair representation we would be overwhelmed by a tremendous majority of other peoples. I think the American people are tremendously opposed to such a result and insist that we remain free from the control or legislation of other peoples who do not understand what America is about, who differ from us in their governmental philosophy, in their religion and in their economic condition, people many of whom do not sympathize with the ideal of liberty at all.

So also we could destroy our liberty by a military and foreign expenditure in time of peace so great that a free economic system cannot survive. Surely we can devise an effective program within the capacity of our free economic system, and not endanger liberty at home in the wasteful protection of liberty from foreign attack. I believe that this tremendous government activity under our present program is a greater immediate threat to our liberty than that from Soviet Russia.

Why is the preservation of liberty at home and a free economic system so vital to our future? Some people talk about the need of preserving the "free enterprise system." I have not particularly liked that term myself, because it has seemed to me that it is too much identified with business freedom only. Liberty should have a much wider meaning. Liberty means the liberty of every individual to live his own life and think his own thoughts, to have those thoughts taught by someone if anyone can be found who thinks they are worth teaching, the liberty of our families to earn their own living and spend the money which they earn on the things that they want for their family instead of turning it over to the government to be used in the providing of government services they may or may not want, and probably may not get. It means the liberty of local self-government—that is the liberty of each community to decide what it wants in the way of those services which are the peculiar function of local government—the right of each community to decide how its children shall be educated, how its fire and police services shall be run, how its welfare services shall be run and what they shall apply to. I don't believe you can have freedom in a country the size of the United States unless you do have the freedom of state and local communities to decide their own affairs. This country is so tremendous that no one sitting in Washington is responsive to local public opinion and consequently the regulations he attempts to make amount to tyranny in many communities where they are different from what the people want. Furthermore, I don't believe that anyone has the knowledge to draft regulations that really fit all the different kinds of situations we have in such a tremendously extended and diverse country. What fits New York City doesn't fit Ohio. What fits the city doesn't fit the country. What fits the Middle West doesn't fit the Mountain States or the Far West. We simply do not have real freedom unless we maintain the independence of state and local governments. That is the basis for the absolute necessity of maintaining the doctrine of states' rights. Not only are the rights of the states themselves important in many fields because of the conditions existing in different states, but it is that doctrine which protects the independence of our cities, our schools and our counties. If it were not for states' rights, we would be legislating in Congress for the city of Chicago, for Cook County, and for every school district in the State of Illinois.

Liberty means the right of every man to choose his own occupation and work in the field to which he is best fitted. It means the independence of every man to run his business or his farm as he thinks it ought to be run as long as he doesn't interfere with the right of other people to do the same thing. In this economic field any real freedom includes a reward and incentive if a man is a really good workman and is willing to spend his time and his efforts on better work. It means a reward and incentive in business for genius, daring, ability and the willingness to risk what one already may possess, in return for greater gains.

The result of this liberty in the United States has been to permit a tremendous development of new ideas in every field of intellectual life. Those ideas have competed with each other until the best came to be accepted and led on to constantly greater development in science, in agriculture, in industry, in education, in government.

The most extraordinary effect of our liberty has been in the improvement of material standards of living. By the development of new methods in manufacture, distribution, and agriculture, the American workman—and the American farmer—has gradually come to increase his productivity until he produces 2½ times as many things as the British workman or the British farmer. If more goods are produced per person, there are obviously more to divide up per person. That means that everybody in this country on the average has a standard of living 2½ times what they have in Great Britain—more of all the things that make life worthwhile—better homes, better home equipment, more electric service, more automobiles, radio, television, better education, better recreation. I believe that it is entirely clear that this is the result of the greater liberty which has existed in our industries, the maintenance of free competition. The growth and competition of ideas has also been promoted by the maintenance of private colleges and private research, and also of many independent state colleges and schools free from any domination by the federal government.

No one certainly is inclined to dispute the great work done by the unions and by the agricultural associations in insisting on and obtaining a fair share of the national product going to less powerful people, and keeping the distribution of wealth just as equal as possible, allowing for the relative contributions made by different elements of the population. But certainly it cannot be denied that the tremendous improvement in this country over other countries has not arisen out of a different distribution of the product, but out of the tremendous increase in the total product which our people have been able to bring about. And that gross product is the result of the liberty which we have enjoyed and the reward and incentive given by a free system to those who have chosen to make the most of that liberty.

But liberty is not license, and it is not laissez faire. All through history, men have warned that liberty, while necessary, can be dangerous. "Oh liberty, liberty, how many crimes are committed in thy name?" Milton

said: "License they mean, when they say liberty." Obviously, no man can enjoy complete liberty without entrenching upon the liberty of others. Government cannot afford to allow complete freedom, or freedom itself would disappear. Government must insure equal justice under law, or no one would be free to pursue his own life as against the reckless and selfish and unprincipled. Government must assure a reasonable equality between individuals, because if certain people enjoy all the privileges and others do not enjoy those privileges, the liberty of these others is seriously curtailed or destroyed. In many cases, we must have affirmative government action to preserve liberty. And so the preservation of liberty is not a negative program but requires a continuous legislative and executive supervision.

Thus people found that if there were no government intervention to maintain freedom of competition, some company monopolized an entire industry and no one else was free to enter into that industry or introduce a new idea. Probably nothing has maintained real competition in this country and prevented the stagnation which we see in English industry, as much as the Sherman antitrust law, and the other laws which support it.

So, also, in the field of labor-management relations, we found it necessary to have labor laws like the Wagner Act and the Norris-LaGuardia Act first, and the Taft-Hartley Act later. These laws were enacted so that workmen would not be at a disadvantage in dealing with a powerful employer who could deal with a thousand men one at a time, and so that a small employer or an individual union member would not be at a disadvantage in dealing with a powerful union. In other words, these laws were passed to eliminate special privilege with power so excessive that it destroyed the liberty of other men. The minimum wage law is based on the theory that without government intervention, oppression can occur, principally in unorganized industry. The support of farm prices is based again on the protection of a large group of small economic units against the injustices that may result from a completely free market. In the field of inflation also, government has to step in to prevent the excessive expansion of credit which in times past has destroyed the very basis on which a free economy must rest. Certainly, a depression not only brings great hardship, but limits seriously the liberty of millions of people and the rewards to which their work entitles them.

Also, as our civilization becomes more and more complex, it becomes more and more necessary to have government regulation which will permit all to enjoy as much freedom as possible without infringing on others, as in the field of radio and television. We have to have government regulation through the Federal Communications Commission in order that anyone may be able to hear and see the words and pictures that are put on the air.

So in civil aviation, we have to create a new government board and a series of regulations if there is to be any safety in the air. The more complicated our life becomes, the more necessary it is to reconcile the different freedoms of different people. Our automobile traffic requires more and more red and green lights.

But in all of this regulation, the main purpose behind the law must always be to maintain just as much freedom as is possible under the complicated conditions of modern life, and

Senator ROBERT A. TAFT

to prevent the constant tendency of individuals to try to achieve special privilege and special power. Our laws should be drawn by men of ability and good will in such a way as to preserve the essentials of freedom.

Today, it seems to me, we face the greatest danger to liberty that this nation has ever faced. As we look back through history, we can see how over and over again a nation has established freedom; how, over and over again, it has lost that freedom. The Greek cities turned into tyrannies, the Roman Republic into an empire, the middle ages cities were taken over by kings and emperors. Usually freedom was lost because the people surrendered powers they had enjoyed perhaps because of some temporary emergency, without realizing how important it was to retain that freedom and how difficult it was to regain it.

Our greatest danger from outside of the country today is from Soviet Russia. It is not only a danger of military invasion, but it is also a danger of the infiltration of a philosophy which appeals to many. We are meeting it with a tremendous program of military expansion, of alliances with other free nations, propaganda and infiltration on our own part. Not only is it a danger from outside, but the size of the program required to meet that danger is so great as to threaten liberty itself here at home.

This second threat to freedom of this country comes from big government itself. Our ancestors, when they established this nation, realized that the greatest task they had was to protect the people against the excessive power of an arbitrary government. The reason for the checks and balances we have in our Constitution, the reason for the often inefficient organization, and for the division of powers between the federal government and the states, for the division of powers between the Executive and Congress and the Judiciary, was the vital need of keeping anyone from assuming arbitrary power. But today we face a danger which we never have faced before. Big government has constantly increased in size and in power. Twenty years ago the federal government took 6 percent of the people's income. Today they are spending 28 percent of the people's income and the taxes run over 25 percent. When we add to that about 7 or 8 percent for state and local government, we find that the total tax burden today is approximately 30 percent of the people's income and government spending more than a third of that national income. That means that the federal government is conducting over 28 percent of the total activity of the people of this country and other governments 7 or 8 percent. Frankly, I do not believe that we can impose on the people a burden of total government in excess of about 25 percent of the people's income, if we really desire to continue a free economy. The taxation required becomes exceedingly burdensome, so burdensome that it is almost impossible to balance the budget, and creates an inflation which destroys the whole basis of the system on which a free economy and rewards and incentives are based. The burden on business is so great that there is no incentive to men to go into new business and start all of those small business concerns from which our large industries have always been built up. Small business concerns with new ideas and new energy and new methods mean the increase in production which is so necessary. Also, a free economy has profited from hundreds of private charitable institutions, hospitals, universities, all entirely free from the domination of government and free to introduce new ideas and new methods. Taxation is so heavy that all of these private institutions are turning more and more

to government for support, which in turn increases the further activity and power and taxation of government. At some point this burden becomes so great that there is a constant spiral of further government activity and we find it just as easy to socialize a country through the expenditure of money as by direct taking over of industry. We are faced also at the same time by direct grants of power to government which then undertakes to conduct business itself, or to regulate to death those private industries which still continue. The excessive regulation of railroads has prevented any new money being invested in railroad stocks for many years.

We have seen recently the attempt to impose price and wage controls to prevent inflation, and that involves the government regulating billions of transactions which occur every day in the United States. Business men have to go to Washington to get approval of the purchase of new machinery or the trying out of new methods. This whole industrial improvement process is bogged down by such control. Furthermore, price control doesn't really work, except perhaps in time of war. If it really is up against any strong tendency to increase prices to meet economic conditions, no one knows how to avoid black markets. In wage control we see how the Wage Stabilization Board was utterly unable to maintain any formula for the control of wages. Furthermore, even if they worked, price controls defeat their own purpose. If prices are held down, it tends to increase demand and decrease supply; whereas the proper method of meeting a price situation is to decrease demand and increase supply. If, in time of war, it is impossible to prevent a tremendous deficit, then we have to have price controls simply to slow up the process of inflation, although they cannot prevent some ultimate inflation. Price controls also work better in time of war under the pressure of national patriotism. I believe the Eisenhower Administration is entitled to great credit for removing all controls, and there should be no attempt to impose standby controls. Price and wage controls are no part of a free system. They can utterly destroy a free economy. Yet people have come gradually to accept them simply because they have been used and there is a natural human desire to have somebody hold down the price of those articles which "I" have to buy. But if price and wage controls become a permanent part of our economic system, it means the end, I believe, of the very progress which will cure the hardships which might result temporarily from high prices.

We are also faced with an effort to put the federal government into the actual conduct of business, a process of direct socialism which has gone so far in England. However, government activity may be justified in particular emergencies, and in fields where only the government can hope to operate. But certainly experience, as well as theory, lead to the conclusion that there is little freedom or initiative or new ideas in an activity long conducted by government. Government operation should certainly be held to a minimum.

We see also an attempt to extend the federal government's activities over welfare, health, housing and other services which have always been provided by local government and private industry. I have sympathy with the effort to extend federal assistance in these fields to our poorer communities, but certainly it should be based on the need of those who are unable to keep up with our strenuous economic activity and maintain a reasonably decent life for their families and particularly for their children. It seems most unwise to use federal funds to extend the action of government into welfare services for which the great bulk of the people are able to pay on a business basis.

The greatest single force today building up the power and spending of the federal government is the tremendous scope of our military and foreign aid programs. It can only be said that these programs must be held to the minimum required for national safety and every cent of waste and extravagance must be eliminated. I believe the Eisenhower Administration is inspired with a determination to make these economies, different from anything we have seen in the past twenty years.

There is another field of freedom which is giving great concern to many people. It is felt that the investigation of Congress is excessive in trying to ferret out the existence of communism and is in danger of being extended to mere attack upon those who are favoring a left-wing socialism which has no direct connection with Russia. Personally, I think this fear is greatly exaggerated. After all, we are spending billions of dollars and endangering the very freedom of this country, in trying to meet the attack of communism from Russia. I see no reason why Congressional committees or others should not bring to the attention of the public the fact that men are communists if they are communists. I know of no civil right infringed upon by such publicity, particularly in fields infiltrated for the purpose of affecting public opinion, like the teaching profession, the movie and television field, and the publishing field. But I see no particular purpose in examining the views of a few individual professors if they are not part of an organization promoting the spread of communism.

The question whether men should be dismissed from their jobs after the public has been made aware of their connections is an entirely different problem, a much more difficult one, and certainly depends very much on the particular case.

I see no reason why the government should continue to employ people with communist sympathies. On the other hand, it seems to me doubtful whether anybody ought to be fired from a job in a college or elsewhere if he is not using that job to spread and teach doctrine intended to undermine and overthrow the government of this country in favor of a communist state. But those who are objecting to investigation seem to me to be claiming a freedom that does not exist. They not only want to express unorthodox opinions, but they want apparently to be free from public criticism for expressing unorthodox opinions. Certainly, the people of this country have a right to criticize communists, and even criticize them to an extent which might drive them from the positions where they are able to influence other people. I have run for office frequently, and my enemies have not hesitated to lie about my position and do their best to drive me out of public life. I don't quite see why professors or others should be immune from such criticism and action. I must say as a member of the board of trustees of a university, I would not favor firing anyone for being a communist unless I was certain that he was teaching communism and having some effect on the development of the thought of the students.

I believe that our great task today is one of keeping this country on the track of freedom. It is a difficult job to reconcile the different freedoms which conflict with each other, particularly as life becomes more and more complex. It takes brains and a careful discrimination to enact the right kind of statutes and adopt the right kind of policies. I believe this country believes in liberalism. I believe liberalism means the maintenance of an essential freedom. No matter how it may be necessary to limit this activity or that, we can still, as we work out the program for government action, do it in such a manner that it maintains the very maximum of liberty.

If we can keep liberty alive I see no reason why we should not go on expanding in material welfare. I see no reason why the standards of living of this country should not continue to increase at the cumulative rate of 2 to 3 percent a year, doubling every 40 years as they have during the past 100 years. There is no limit to the capacity of the American people to produce, and bring to all the citizens of this fortunate country the standards of living which we regard as essential for true progress. Let us keep constantly before our eyes the fact that these are the blessings of liberty. They can only be retained by eternal vigilance.

SHARPENING THE TOOLS OF MANAGEMENT

The Indispensability of Production-Management Direction —From the Point of View of the Large Canner

By Roy G. Lucks,
President,
California Packing Corporation

Every responsible business executive recognizes that in order to ensure the continued welfare of his organization direction of production management is indispensable. Consequently, no elaboration of the indispensability of such direction is required. Management direction, while the over-all purpose is the same, nevertheless varies between different types of organizations and the individuals involved in the management of those organizations. Some of the problems involved and some of the facilities which may be employed by management so that it may be more effectively directed is the theme I will endeavor to expand.

In this country, as in few others, the individual who has ideas can get backing for their development because he has freedom of action, and his reward will be commensurate with his ability.

Since this freedom of action granted to the individual business man extends to all, there is necessarily keen competition among those who choose to exercise it. Profits are the reward of those who succeed and losses the penalty for those who fail. It is evident, therefore, that it is the individual around whom management activities revolve.

Business was first conducted by the individual. As business developed, it became more complicated and men with different talents associated themselves together creating a business unit that would have the benefit of the combined complementary talents of the men so associated. Thus the large corporation came into being, from which viewpoint my remarks are being given.

The particular techniques used by a corporation to keep its head above water in this competitive field of ours are known to the management of that corporation only. That is as it should be since this is a competitive economy. The individual corporation, as any other individual organization, has its freedom—

First, to develop the most efficient productive methods so as to be competitive in its field;

Second, to sell its product where and to whom it chooses; and

Third, to sell for as high a price as the law of supply and demand will return, commensurate with public responsibility. Such are the privileges and opportunities of our industry.

It is recognized that these concepts of operation are—and should be—refereed by certain government curbs to prevent any business firm from encroaching on the rights of others. While we do not want unnecessary restraint on the freedom of individual action, nevertheless we must admit there is a need for a temperate referee in certain fields of activity.

From time to time, it is a good practice for an industry as a whole as well as an individual organization

ROY G. LUCKS

to take stock of its position. The canning industry is relatively young compared with many of the other large industries in the United States, such as steel, coal, and others. New developments are rapidly occurring. Accordingly, many of the techniques which we take for granted today may be outmoded tomorrow.

The members of this industry must be sufficiently flexible to adjust themselves to these changes if they want to survive. So it is that the Association which serves these members must also be flexible and subject to changing the emphasis on its activities.

This will to survive spurs on the constant effort to improve the efficiency of operation, and the available tools of management should be sharpened for this purpose. We must recognize that each individual canner has a responsibility to the public, his employees, his growers and his stockholders, to develop the highest degree of efficiency in operation and to produce and maintain a quality of product that will be a credit to his company and to the industry.

Production management direction can follow two broad paths:

(1) Direction and control of those internal problems of operating a business which are under the direct control of the company, and perhaps peculiar to that company, and which must be solved by its individual actions; and

(2) Direction of industry problems which can be solved only by collective action of its members.

What we are interested in discussing here are the problems which cannot be solved by individual action and which, therefore, are the responsibility of all members of the industry.

To handle such matters, we have facilities such as the regional canning associations to which many of us belong and, on a national basis, the National Canners Association. These organizations exist for the purpose of handling problems of community interest to all canners. They should not attempt to do for the individual that which is his own responsibility.

We have gone through a period of paternalism in our political economy during which an overly benevolent government has encouraged an individual to depend on it to assume the responsibilities which properly belong to the individual. We believe, however, that a change in this political philosophy is rapidly taking place.

It behooves us, therefore, to profit by this national experience and not weaken our industry by delegating to the Association responsibilities which belong to the individual canner but, instead, concentrate the efforts of this organization on those problems in which we have a common industry interest.

The National Canners Association provides a strong, national trade body which, over the years, has served the industry effectively. We can see many values derived from the different departments of the National Canners Association which help us solve those problems not only directly affecting us but which also concern the industry as a whole.

A great deal of the work being done by the Association is unknown to the majority of the membership. This is particularly true because much of the work involves problems of a general nature, the value of which accrues to the industry at large. The benefits to the individual canner arising from such work are very definite and real. He may not recognize them since they may appear in the form of either an improved industry position or the prevention of some situation that has detrimental effects upon the industry.

The Statistics Division of the National Canners Association in compiling pack and stock information, provides a measurement tool whereby we, as a canner, can plan intelligently our production and sales operations.

The work of the two Laboratories was begun as the result of an indispensable need many years ago—a need on the part of the industry to do research work which belonged to all of the industry. It is true that many of us have laboratories of our own to serve our private needs; and that is as it should be, because each canning company has a certain amount of such work to perform.

Consumer acceptance of canned foods is imperative if the industry is to progress. The work of the Home Economics Division, directed at the homemakers of the country, is creating interest in the industry's products and stimulating the use of them.

Part of the consumer acceptance of our product is based upon the knowledge of that product as gained from the information on the label. This activity is being promoted by the Labeling Division. As an industry, it is to our mutual advantage to have our label story in such form that the housewife is able to recognize the full qualities of the product at the time of purchase.

The problem of getting a quality raw product to the cannery involves an area in which men must use their own abilities. The program as carried on by the Raw Products Research Bureau serves to focus attention on the best information obtainable on the current raw products problems of the industry, and the knowledge available through the development of these subjects should be helpful in their solution. There is a vast field of research by others to be coordinated without directly engaging in research on competitive techniques.

The service to the fishing industry through the Northwest Branch Laboratory and the Washington, D. C., Fishery Products Division is invaluable in that field. Its cooperative relations with the Food and Drug Administration and other government agencies are indispensable.

The handling of consumer complaints for the industry by the National Canners Association has, over the years, very definitely protected the industry from unfounded harassment by fraudulent and exaggerated claims.

In addition to all of the foregoing activities, we have an organization which serves the purpose of presenting the industry's attitude in connection with problems relating to the federal government agencies, the Congress and the public.

As examples, we have the tremendous strides made by the industry in its relations with the Food and Drug Administration, working in the direction of wholesomeness of canned foods.

Association Counsel, with its legal staff, provides the industry an excellent basis for working with the many government agencies and interpreting the effect of their regulations.

We have just passed through a period of strict government controls during which the National Canners Association has served the industry well. At times, the Congress has taken up legislation affecting the canning industry; and the industry has been able to effectively express to the Congress its viewpoint on such matters.

We need go no further back than the experience of last spring when the Legislative Committee, over a period of four to five months, presented such convincing evidence to the Congress of the United States that the Congress saw fit to relieve the canning industry from further control of its selling prices.

Other Committees of the Association have been equally active in pursuing the interests of the industry in their respective fields.

If time would permit, many other instances of industry cooperation with government could be cited. These activities are tremendously important because they relate to problems affecting the whole industry and not just the individual, and it takes the whole industry to solve them.

These are some of the facilities engaged in solving problems in their related fields—all directed toward more effective management of our industry.

The recent action of the present Administration, in lifting wartime price and wage controls for industry in general, is confirmation of the fact that the period of shortages is over. We have returned to a production of plenty and to a competitive period where the forces of free competition are being permitted to function.

This competition is not alone from an abundance of supply of canned and other foods, but also from an ever increasing supply of consumer goods other than those which the canning industry has to sell. Large supplies of refrigerators, television sets, clothes, automobiles—all compete with canned foods for the consumer's dollar.

We have been going through a period where production has been paramount. We are now entering a period where production must be subordinated to selling. It is increasingly important that management direction of production be more carefully exercised than in the past in order that production be kept in balance with the normal consumer requirements for our products.

During the recent past we have felt that the importance of the processor's place in the scheme of food distribution has been overlooked and subordinated to that of the producer and consumer. It must be recognized that it is only because the canning industry provides the means for collecting and preserving the perishable food that the consumers of this country are able to eat of the harvest of this land during all times of the year.

There is a story to be told in this connection which has never been adequately developed. We must increase our effort to tell the story of our products and the importance of the processors' function in the economy of our nation. To do this is the responsibility of the entire industry and a challenge to all of us.

The canning industry has a record of which to be proud. Our trade associations, both regional and national, have developed and grown strong. Increased efficiency has been achieved by the industry and quality has improved. Today the industry is offering the consumer a better quality of canned foods, in greater volume, and at a relatively lower price than ever before.

This record points up strongly the basic value of the meetings being held by this Convention, and certainly justifies the emphasis on efficient production-management direction.

The Indispensability of Production-Management Direction —From the Point of View of the Small Canner

By William A. Free, Sr.,
President,
Hungerford Packing Co., Inc.

As a small canner, my reflections must necessarily be somewhat of a personal nature. As the co-owner of a small food processing plant, sharing that ownership with my two sons, my point of view is that of working-management—a sort of "dirt farmer" in business. I recently read in the *Harvard Business Review* these choice lines that seem to apply perfectly to the small canner:

"Small business, no matter what the sales volume or the number of employees, is characterized by the fact that its management people lead a highly complex existence. They perform a wide variety of jobs; those in sales crossing over into production and administration, and vice versa. There are no clearly defined limits of responsibility; and even if there are some demarcations, there is still a

greater variety of jobs to be done by each one than can be mastered by any individual. In more cases than not, too, small business management must dig in at the actual working level from time to time—help to repair a machine, pack a rush order, and so on, rather than just operate at the decision and policy level. It is a sort of chief-cook and bottle-washer existence."

This fits me to a "T", and I believe those words will apply to many other small canners as well.

Now when I reflect on the general business situation of today, I find that the canning industry has failed to keep up in the race for the consumer's food dollar.

We show inertia in the face of accelerated demand and high purchasing power. We have a "come and get it" attitude toward the consumer. We let our rivals do the courting. We retain a lot of antiquity in our methods of production. We haven't synchronized all our moving parts. Where we have made technological advances at one stage of the flow chart, we have done nothing about others. We seem content to rest on the glorious laurels of our past. The Nicolas Appert publicity last fall brought out the fact that the principle he discovered is the same one followed in today's commercial canneries. I find something a bit sinister in this; it seems to reflect more credit on Appert than on the canning industry. Certainly we have shown tremendous progress since his time, but there's still room for a lot of improvement.

Today's economy is moving powerfully fast. It is a horrible thing to contemplate, but it has been observed that the frantic emergencies of one war will stimulate more improvement than a century of peace. World War II, the Korean conflict, and our current defense economy have expanded activity in many directions—production, purchasing power, consumption, and most every business factor.

During the short period of the past ten years, machines have become obsolete more rapidly than in any previous decade, and their replacement with modernized units has been swift. The tempo of communication and transportation has accelerated. In a technological economy, business is not a *level, flat curve*, but one that rises steeply. We cannot let loose the force of technology and at the same time stop growth and expansion any more than an airplane can halt its forward motion without taking a nose dive. Thus, technology has committed us to an economy of ever-expanding production and constant development.

During these same brief ten years, we have seen a larger percentage of consumers move into higher income brackets. I doubt if many of us realize that in 1939, 85 percent of American families were getting less than $2,500 a year, while in 1950, that low income group was only 35 percent of the population. Furthermore, a fifth of all families were getting $5,000 or more per year in 1950, whereas at the beginning of the decade, less than 5 percent had that much income. The median family income in 1939 was $1,272. By 1950, it had risen to $3,353.

Of course, we all realize that higher taxes, depreciation of the dollar, and other higher living costs have cut into disposable income, but even so, the potential purchasing power for our products has increased. This is especially favorable to canners because of the relative position of canned food prices. The canned food dollar is *worth more* than other food dollars.

Along with this gain in purchasing power has come a tremendous increase

W. A. FREE

in population during this same 10-year span. It has added almost 23 million more American mouths to feed. Our population in 1942 was 134.8 million; in 1952 it was 157.0 million. Without figuring any increase in per capita consumption, this population rise alone represents a 16.5 percent gain in demand. This simultaneous increase in both numbers and ability to buy has created a greater demand for American-produced food supplies than the total demand of peoples outside the United States. In short, we have a greatly augmented market right here at home in front of our noses—a tremendous sales opportunity, a domestic potential among people already familiar with and accustomed to canned foods. Yet some of us are saying that our only salvation is the development of an export trade.

In 1948, a survey made by the Bureau of Home Economics and Human Nutrition of the USDA revealed that in the U. S., only about 30 percent of the households were using such a well-known canned item as corn. Degree of use varied from only 13 percent by families with annual incomes under $1,000 to about one-third of the families in the income group of $1,000 to $7,500. Only 19 percent of the families with incomes of $7,500 and over were using canned sweet corn. The picture has probably not changed significantly since 1948. Latest reports (December, 1952) concerning the purchase of canned juices showed, for the most popular canned juices, the following percentage of all families purchasing: orange juice, 12.4 percent; pineapple juice, 13.7 percent; tomato juice, 18.6 percent.

What are we doing to cash in on all that *new* and *old* market opportunity? Does our industry keep alert to changes in the character of demand of the eating public? Most of us have heard women in our circles of acquaintance express preference for other types of food over canned; many of us have seen changes in our home larder unfavorable to the volume of canned foods consumption. When a woman's food-buying habits switch from a certain canned vegetable to a certain "you know what" vegetable, there has to be a reason. What does she find attractive in that form but undesirable in ours? Is it color? Is it appearance? Is it taste? Is it food value? Does canning really rob a food of desirable characteristics that can be found in that same food in another form? Are other kinds of containers more convenient to store or to open than canned foods packages? Do we really know the answers to these questions? Are we trying to find these answers? Or have we become overpowered by a canning industry habit and attitude of expecting the consumer to take what we make for her, rather than finding out what she wants and complying with her wishes? Are we going to keep on the rest of our days putting up the stuff and telling her to "come and get it"? If we do, is she going to keep coming?

I certainly think not. I'm convinced that we've got to supply the housewife with what she wants rather than make her take the product, as and how we pack it.

If it is appearance that turns her away from some of our products, it might mean that a reappraisal of the artificial coloring question is in order. Perhaps we should re-examine the reasons why in the past the industry has shied from this practice. Many other food industries color artificially with no loss in prestige or demand; Maraschino cherries for example.

It could mean another look at our processing techniques—what they do to color, to appearance, to consistency. Isn't it true that in the past 50 years there have been relatively few changes in the processing methods for our

principal commodities? In my day I can recall only one major change in our retort room—the installation of automatic time and temperature controls.

I realize that canning technologists, not only in the N.C.A. Laboratories, but throughout the industry, have had uppermost in their thoughts the fact that heat sterilization affects product characteristics. I know their guiding principle in processing investigations has been to try to arrive at processes causing the least product damage consistent with safety. With still-retort processes the best possible achievement still is often disappointing. But the technologists are working hard and conscientiously and persistently in that direction. They have shown more concern about this than have canning executives.

There are some successful skirmishes to report even though the industry hasn't achieved a major breakthrough. Marked improvement has resulted from high temperature agitating cooks; with corn, for example, quite an astonishing betterment of product has been achieved. One feature of the Blair process and similar processes for peas is a high temperature-short time cook, and in fact that latter feature alone gives a pretty good color retention. Unfortunately, the quality improvement doesn't last in storage except at low temperatures. There is something encouraging and promising in recent developments in canned orange juice. Some years ago the canners who were heat-sterilizing orange juice were threatened with being put out of business or absorbed by the frozen orange concentrate packers. Now this major competitive development—once the talk of the trade—is itself facing new competition from a pasteurized orange concentrate that does not have to be frozen. And there are indications that still another orange juice method is being developed. I think that technology will meet the need for ways in which canners can increase consumer acceptance of their products. The session on this Convention program that deals with processing methods and equipment is certainly one we should all attend.

In my own firm, we do everything possible to increase our technical skills in quality control. We buy the latest in mechanized equipment and follow the accepted sanitary practices. I walk down that line and see those open cans of gleaming snap beans on the conveyor going to the closing machine. The green is positively sparkling! But then something happens; something takes away all the romance! When those beans come out of the can, that sparkle is gone. I miss it, and maybe the consumer does too.

Sometimes I wonder if we aren't too removed from the housewife to know exactly what she does want. There are lots of folks between where we pack and where she buys—the broker, the wholesaler, the retailer. Should we rely solely on these fellows to post us on what is going on? Eventually we do find out—frequently in the form of reduced sales, and sometimes in the form of business failure. The record of mortality in the canning industry in recent years is grim evidence of that fact.

We have the problem of keeping constantly on the alert to evaluate changes in consumer buying habits at the retail level. How can a canner know intimately just what is going on at point-of-sale? Do our brokers permit an intimate relationship with our buyers? Is that several degrees of separation between packer and consumer acting to keep us apart and consequently ignorant of changing consumer tastes and desires? I have experienced many occasions when our buyers have been extremely pleased and enthusiastic over an opportunity for direct contact with us, and the benefits from such instances have been mutual.

The important thing is that when we do derive knowledge about changes in consumer preferences, or what is influencing her buying habit, we must reflect such changes in the production end of the business, even more than at the sales end. We should, therefore, welcome the kind of Production-Management program the Association has arranged for this Convention. It covers almost every problem a small canner meets in these times.

Whenever the acceptance of our product is threatened, the only hope for permanent solution lies in the production area; sharpening our salesmanship is at best only a temporary relief. This problem of keeping production geared to changes in consumer buying habits is in some ways easier of solution for the small canner, since he more frequently has immediate direction of both production and sales. He can keep an eye on every sale and at the same time personally handle many other details in planning and operating his business. A consistently profitable business results more frequently from constant attention to minute details—from being smart about costs, about sales, about markets—than from simply having the will to profit. The small canner is in a good position to give attention to each operating detail of the business, to capitalize on his capabilities, his business acumen and judgment, and to translate these into action by his small force. Many canners have demonstrated the advantage that small size gives them.

But there likewise are many small canners who have been too content with mediocre operations, hoping that these advantages in size, in proximity to the market, in quick control of production and sales, are all that are needed to bring about a profitable operation. They are like the ancient philosopher who stumbled into the gully because he was absorbed in gazing at the stars.

Of course, it has always been true in the canning industry (and in any non-subsidized business) that our marginal operators eventually go out of business. That is not a new condition. It is a comparatively new condition that fewer independent, small operators are now entering canning. But the newest development of all is the speed with which changes are taking place, necessitating a compensating speed of adjustment in both canning sales and manufacture.

The rapidity of disappearance of the marginal operators constitutes an advantage to those who stay in and do an efficient job of production and sales management. The smaller the percentage of operators who rely on geographic and other advantages, the healthier the over-all competition.

No industry can maintain a place in this highly competitive economy by standing still. Successful businesses perform their fundamental services in a manner superior to their competition. Their management discerns general economic trends, anticipates the changing needs and wants of customers, understands the forces that affect market value of the product, and is thus able to take advantage (earlier than the competition) of any unusual variations in cost and prices that go into the manufacturing process. The smaller, more flexible, faster moving organization of the small canner can be a handy thing.

It is vitally important also to have an understanding and to be aware of the financial condition of the company and to know the financial relationships necessary for a healthy business condition. Here again the small canner has an advantage because he can more quickly and currently obtain an accurate picture of these relationships—provided always, that he knows how to recognize financial trouble when it is brewing and what to do when he spots it.

The canning industry can truthfully boast that it has made great strides in mechanized assembly-line operations. This is reflected in statistics on industry productivity. Data available for the year 1950 show that output per man-hour for the industry was 31.6 percent above production per man-hour in 1939. Actually, most of this gain in efficiency was accomplished in the years 1948, 1949 and 1950. Using 1939 production per man-hour as a base equal to 100, the index for 1947 was 111.1, but the next three years showed remarkable gains; 1948—116.4; 1949—127.6; and 1950—131.6. On the basis of output per production worker, the improvement is still greater. In 1950, the figure was 139.7 percent of the 1939 output.

While we've had this remarkable speedup in canning factory operations

due to our streamlined, automatic machinery, not all of the operations we undertake from field to store have been similarly speeded. As I stated at the beginning of this speech, we haven't synchronized all of our moving parts. Mechanization in the cannery has been applied more than in the harvest of our raw products. Thus we have increased our potential in some departments more than in others—in the factory more than in the field. As a result, we have a bottleneck, forcing us to a greatly increased use of inefficient and expensive labor to keep the raw product coming rapidly enough to utilize our hopped-up factory units.

Utilization of these higher speeds is an essential part of the industry's job of ensuring quality, while at the same time holding down unit costs in the face of increasing prices of raw products, wage rates, and other costs. Labor costs per unit do not increase as fast as do wage rates. The operation of handling more produce through the cannery and thus increasing the productivity of labor and the lowering of unit costs has been the salvation of the canning industry. Nevertheless, it creates problems, and one of these is the necessity for an equivalent boost in the speed of harvesting operations. To bring about, therefore, the modernization that we have achieved under the cannery roof, we canners need such an organization as the National Canners Association, which can spearhead such programs more effectively than can any individual canner, large or small. Elimination of bottlenecks in our production is one of the most important contributions that N.C.A. could make to this industry.

When an industry marches forward, its very advances in operating techniques sometimes create problems. Speed the mechanized operations in the cannery and you intensify the problem of controlling quality. That human element essential in quality control operations does not lend itself to standardization as does a machine. Consequently, we have to watch quality control operations more closely than we had to a few years ago. But we shouldn't stop at merely maintaining the same level of quality of the past. That's not enough. The industry has to improve on quality, and uniformity of quality, certainly, is an indispensable part of a canner's operation if he is to keep faith with the consumer.

Although I've argued here, and have repeated myself in saying that we must get closer to the consumer—must be better informed about her tastes, preferences, and the changes in her buying habits—and have implied that our industry would be better off with a closer integration of all factors—grower, manufacturer, supplier, seller, consumer—the fact remains that the canner and the canner alone is responsible for his maintenance of uniformity and high level of quality. That responsibility cannot be assumed by anyone else because it is an essential part of the value of the canner's individual brand or product. But the development of the mechanics for quality control; the improvement of production techniques; and the management of production are problems on which the canner has reason to expect assistance from the National Canners Association. This year, this seems to be offered in abundance in the agenda of this Convention program.

But there is one thing missing in the agenda. Is it not time that Mrs. Consumer be told and retold the facts about canned foods through some sort of Association effort? Is it too much to ask our National Canners Association to investigate the feasibility and interest that might be manifest throughout its membership? This should not be the question of the small canner alone—the large canner would proportionately share in the resultant increased consumption of our products through a full and properly conducted endeavor. How else can small canner and large canner alike participate in an industry-wide effort of telling the merits of, the goodness of, and the economy of canned foods except through the N. C. A. spearhead?

Is it worth looking into?

Yesterday I posed these questions to the Administrative Council and there was an hour and a half discussion of the best methods to meet this problem. The Council unanimously passed a motion recommending—and it received Board approval also—the appointment of a special committee to investigate the possibility of increased interest in the use of canned foods, such committee to make a report and recommendations to the Board of Directors.

Success in today's highly competitive field of canning calls for alertness, vision, shrewdness, technical knowledge, a new courage, and a lot of work and straight thinking on the part of individual canners and their national association.

All things are changing. Are we keeping pace?

Industry Planning through Two Decades of Annual Conventions

By H. Thomas Austern,
Chief Counsel,
National Canners Association

It is difficult, indeed a little frightening, for me to acknowledge that this is my twentieth annual canning convention. Perhaps, therefore, you will indulge me a moment of reminiscence.

In the fall of 1933 here in Chicago, the officers of the Association met with Mr. Gorrell to consider the then proposed NRA Code. It is no secret that Frank Gorrell did not like the idea of a mandatory code. He had many reasons—but the principal one was that the National Canners Association had never undertaken to tell any canner what he *had* to do. Abhorrent to Mr. Gorrell and those responsible for Association policy was the prospect of a detailed code of operating rules, and of a NRA Canning Code Authority to make additional rules, that canners would have to obey or else face criminal penalties.

The canning industry then—and it is still true today—epitomized the American idea of free individual enterprise. The job of the National Canners Association was to give to each canner the information and the tools with which to work. What he did, what he packed and how much, where and to whom he sold was his own business.

Present that afternoon in 1933 was a young lawyer who had been assigned by Judge Covington to help write the code. However abundant his zeal, he unfortunately had not been told that canning industry enthusiasm for codes and rules and regulations was hardly warm. He tried to be helpful by offering complicated solutions to the many objections raised. When someone suggested that a National Canning Code Authority, to resolve conflicts for all products packed in all areas, was wholly impracticable, this eager beaver advanced the happy idea of area code authorities—with intermediate regional canner appeal boards—and at the top of this wonderful pyramid a National Code Authority.

I think it was either Marc Hutchinson or Ed Trego who politely suggested that this might be a difficult scheme to formulate. But nothing daunted, the young lawyer volunteered to have it drafted by the next morning. All through the night, in a badly lighted and extremely cold hotel room, he labored with typewriter and scissors and paste pot. By the next morning there was ready a most intricate and beautiful legal edifice—complete with jurisdictional provisions, elaborate forms of appeal, prescribed methods of findings, and all of the legal paraphernalia for these triple-decked canning code authorities. It is a fair guess that had any group of canners ever attempted to operate this system, no time would have been left for their own business.

Early in the morning the young lawyer took a shower, and eagerly turned up in Frank Gorrell's office with a large sheaf of papers embodying the new and wonderful draft.

Frank thanked him courteously, and carefully put the night's work in his brief case.

So far as I know, it is still there. For in all of the later deliberations not another word was ever said by Frank or by anyone else about regional code authorities.

In that fashion, I very early came to learn the fundamental premise of N.C.A. operations. Later I understood why Frank Gorrell had kept the NRA out of the Association, had divorced himself from it, and had refused in any way to support the Blue Eagle notion that any small group could tell everyone in the canning industry what to do.

The Gorrell theory—on which he had built the Association—was that N.C.A.'s primary task was to provide promptly all accurate, up-to-date information, but never to attempt to substitute its judgment for that of the individual canner. In addition, when an Association committee spoke for the industry, it always democratically reflected a majority judgment reached only after careful consideration of all of the facts. Even more important, no N.C.A. staff member ever presumed to speak for the whole industry, or pretended to have authority to bind individual canners.

Let us admit that business life in the early thirties was simpler. The area of governmental control of business was narrowly circumscribed. A surprising number of canners packed only one or two products. Some still marketed their entire packs, predominantly to wholesalers, soon after the close of the packing season.

There were no wage and hour controls—no AAA or NLRB or alphabetical administrative abracadabra of any kind—no mandatory standards of identity—no social security taxes—of course, no price ceilings—and the corporate income tax was painfully high at 12 percent.

The National Canners Association at that time functioned largely through what were called Commodity Sections. The necessary technological information was furnished and current problems canvassed in fairly small section meetings of canners who packed the particular product. We had a Corn Section, a Tomato Section, and an economically doleful Baked Bean Section. Indeed, the same pattern was reflected in the regional commodity associations which covered several states yet concentrated on single products. These were typified by the Kraut Association and the Pickle Packers Association.

N.C.A. also functioned with a far smaller staff—with one man handling all information work, one man raw products, one man consumer complaints, and a modest laboratory group. The INFORMATION LETTER was 6 x 9 inches, and four small pages were often sufficient to tell the membership what the federal government was doing and all other industry facts.

Then came the New Deal, beginning in March, 1933. In the next seven years the industry encountered the Agricultural Adjustment Act with its marketing agreements and licenses; the NRA and its feverish two years of codes; the federal wage and hour law with its "area of production" mystery and its aggregation of different kinds of workweeks and exemptions; the Robinson-Patman Act; the National Labor Relations Act; a new and comprehensive Food and Drug Act; the novel and complicated federal old age insurance levies and unemployment taxes with their concomitant state laws. It had to meet attempts to impose and freeze standardized can sizes, a persistent and prolonged argument about Mandatory Grade Labeling, the introduction of BAE (later AMA and PMA) voluntary grading and inspection, state prorate laws, the Walsh-Healey Act, the Motor Carrier Act regulating trucking, increased and complicated business taxes, and a host of other New Deal regulations. Possibly only those who directly experienced the feverish days of that rapid and revolutionary expansion of governmental controls can fully appreciate the impact of their rapid succession and complexity—and the demands they made on the canning industry.

To cope with its task of keeping the industry informed and of providing reliable and accurate guidance for canners, the N.C.A. adopted varied techniques. In 1934 it established, under Carlos Campbell's expert guidance, its Statistics Division. By 1941 the hard work of the many committees who had dealt with labeling and grading led to a Labeling Division. The Laboratories were expanded, and Home Economics work increased. Since the depression years had also brought a considerable increase in consumer claims, the investigation work had to be expanded—and for the assurance of canners a protective trust fund established by the Association.

But the brunt of the job was to keep the indsutry informed. The INFORMATION LETTER grew to its present large format and scope.

As each new federal control blossomed in statute and regulations, a newer technique was employed of expounding its particular application to the canning industry, and explaining its often complicated provisions, in a series of N.C.A. pamphlets and booklets. Some reached formidable proportions and could be processed only on a No. 10 line.

It is gratifying today to find basically accurate and still useful these Association publications on old age insurance and unemployment taxes, on the wage and hour law, on the 1938 Food and Drug Act, on the Walsh-Healey Act, on the Robinson-Patman Act of 1936, on descriptive labeling, and many other subjects that canners had quickly to assimilate and to which they had rapidly to adjust their individual operations.

Indirectly, the massive impact of this explosion of government controls in the 1930's also evoked Association expansion. Frenetic proposals for marketing agreements and licenses showed the need for education as to the community of interest between procesor and producer, and led to the series of canner-grower studies and pamphlets.

There were also conferences on canner-grower relations. At one of these Henry Wallace observed that canner and grower were like husband and wife—and one rude fellow asked which was which.

Since the late thirties did not bring apple-pie profits to many parts of the canning industry, the Association turned also to economic and trade studies, reflected in the published recommendations on sales contracts, guarantees, and the penetrating report on canning industry investment and return by Dr. Neil Carothers.

For by 1941 the pattern of distribution in this industry had slowly but dramatically changed. No longer did the canner complete his year when he finished his pack. The depression years had brought hand-to-mouth buying. Direct selling to chain stores, cooperatives, and voluntaries had vastly increased. The packing, merchandising, and one must add financing, job of the canner became a year-round and highly demanding activity.

More important, however, most of these new federal and state controls, with which canners had to concern themselves, cut across *all* canned foods; and, with the notable exception of marketing agreements, could not be dealt with on a product by product basis. The utility of separate Commodity Sections diminished. Comprehensive pamphlets and published explanations were not enough. Entire convention sessions had to be devoted to single subjects applicable to all products. Indeed, a great many special sessions had to be scheduled to deal with particular statutes and regulations. Necessarily, the number and the activities of Association committees had to be expanded.

Yet throughout all of this prewar manifolding of Association activity, its basic principles were maintained. The cardinal responsibility was to keep the industry informed. No action was taken or position asserted that did not reflect the views of the predominant number of canners. As always, no one was told by N.C.A. what he had to do. Even throughout the passionate arguments about the economic validity or futility of specific marketing agreements and licenses, proposals were freely sponsored and forthrightly opposed by the independent action of individual canners or groups.

Under obviously trying conditions, the spirit of individual responsibility

and of independent free enterprise—based on each company's judgment of its own economic welfare—was preserved and fostered.

This basic belief in individual enterprise and real competition—and its reflection in how the Association operated, and still operates—is underscored by the record of its freedom from legal trouble. Never in its history has N.C.A. been in litigation—never has it been a party to an antitrust proceeding—and never has it been singled out as the target for Congressional or administrative attack on the propriety of Association activity.

This record rests, not on the wisdom of counsel, but on the meticulous adherence of the staff and committees to these basic principles. It is all the more impressive when you remember that the Association throughout the years has never hesitated, through its committees of hardworking canners, to speak out, or to object to what the industry believed was unsound legislation, distored interpretation, or unwarranted exercise of governmental authority. Its position throughout these hectic New Deal years from 1933 to December 7, 1941, was based always on cold facts, restraint, but steadfast adherence to what canners believed was sound.

Moreover, time in most instances has proved it right. Many have forgotten that had the proponents of marketing controls not been resisted in their theories on historical allocation or quotas, there might have been no canned pea industry in the Pacific Northwest, no vast canned citrus juice development, and no realistic basis in a thus strait-jacketed industry for the vitally needed expansion of canned food production during World War II.

The war years—that in some ways really began even before Pearl Harbor—multiplied the responsibilities of the Association. Its job of keeping every canner informed was hardly lessened under War Production Board controls, Department of Agriculture war directives, subsidy programs, sugar rationing, rationing of canned foods with red and blue stamps, OPA price controls, container limitations, set-asides and other problems of military procurement, gasoline rationing, wartime excess profits taxes, renegotiation, and all of the other imperative controls that went to make up total war. Moreover, all of that had to be undertaken by the canning industry with lessened manpower.

There is no need for me to recall to you the magnificent wartime production record that was achieved by the canning industry. Nor do canners need be reminded of the contribution of the Association to that effort. But viewed historically, we all know that during these war years the whole orientation of Association activity and annual conventions was changed. To be sure, the cardinal job of providing information, meeting processing needs by laboratory research and service, and such routine though basic tasks as providing needed statistics, continuing consumer claims services and home economics work, were not neglected. Nevertheless, annual conventions became largely conferences at which the aims and needs of the war effort alone were presented. Indeed, one annual convention had to be entirely eliminated because of wartime transporation difficulties. Inescapably, the annual convention became far less meetings of canners to discuss their own problems, and more a parade of government officals, some aggressively and others reluctantly, *telling* canners what they had to do.

Very often what went on reminded one of Carl Lovegren's favorite gag—getting into a taxicab and saying, "Where to, driver?"

Necessarily, N.C.A. provided the vehicle for cooperation and the focal point to which government agency and canner alike were happy to turn. Yet it cannot be denied that much of N.C.A. time, energy, and budget centered in its War Mobilization Committee and subcommittees. The rest was concentrated on production. The problems of how to operate the individual business in the rugged competition of an uncontrolled economy were to a large extent postponed. Even those few who worried about possible postwar surpluses were somewhat comforted by the increased per capita consumption within the framework of red and blue ration books.

H. T. AUSTERN

The interlude between V-J Day and Korea, roughly 1946 through 1950, was marked by the efforts of the canning industry and the Association to return to their historic pattern. Yet as Judge Covington once pointed out to this industry, the pendulum of government control never fully returns to its starting point. Psychologically as well as legally, the theory of a "national emergency" prevailed long after hostilities ceased. Indeed, some wonder whether the psychology of control ever really relaxed between World War II and 1951. Historians, I believe, will find abundant evidence that the theory of national salvation through more and more control never lost momentum between 1933 and 1953.

No one can deny that when the Korean hostilities began the hot phase of the cold war in 1950, the full panoply of war controls was more readily and comprehensively applied than in World War II. Many in industry—and a fairly large group of canners—believe that much of this control was unthinkingly applied without examination of the vast changes in productive capacity, or evaluation of the underlying supply and demand, or of the other real exigencies of the situation. The deterioration of price controls in particular—and the current apprehensions about an economic depression—may lend some support to that view.

As one who was privileged to observe at close range what happened in both periods, I think it may fairly be said the recent N.C.A. job equalled, where it did not surpass, the performance during World War II. Yet credit for this is not due entirely to N.C.A. For a new generation of canning managers had taken over. They had a better understanding of government controls and extensive wartime experience with their operation. They had developed industrial resilience, and had come to learn the art of fully utilizing the technical service and statistical information available to them.

Above all, the canning industry had learned that Benjamin Franklin was right about the need for hanging together, and had developed the courage to insist that patriotism should not forestall forthright resistance to unsound regulation or to arbitrary abuse of authority.

Let us briefly look ahead—

Earlier this year Fred Heinz emphasized that the change in Administration in Washington will not mean the end of all federal controls. Apart from material allocations and price controls, now largely lifted, most federal regulation and control crystallized in permanent legislation. I have heard no one suggest outright repeal of wage and hour laws, or of old age pension provisions, unemployment taxes, and other social security enactments whose coverage is instead expanding. Additions to the Federal Food and Drug Act to meet the new problems of pesticides and chemical ingredients are being actively debated and new legislation is anticipated. Agricultural controls are not likely to be relaxed in the face of current price declines—whatever new formats or

formulas are developed by the Republicans. Labor laws may be overhauled but not relaxed in their universal coverage of industry. Employment of migratory or imported labor is encountering new controls. The anti-trust acts, including the Robinson-Patman Act and the new prohibition against mergers or acquisition of competitors, are constantly expanding by Commission and court decision. And the ending of excess profits taxes, even when accompanied by an increase in the basic corporate tax rates now over 50 percent, is welcomed by many as a return to more normal times.

The new Administration will not stop with abolishing the high silk hat at Inaugurals—or alone deal with the grim realities of Korea and international affairs. It must also cope with the inescapable factor that government taxes and spending represents in our present-day economy.

My point today is not to argue the merits of any specific program. It is that despite President Eisenhower's State of the Union message—and its promise of less government in business and more business in government, industry must—and most informed canners do—plan the future in the knowledge that there can never be a return to the quiet economic freedom that prevailed 20 or more years ago.

However, this does not mean that today there is no scope for individual enterprise, no better reward for initiative, or no room for progress by the industry and the individual canning company. It is of course essential to have lawful collective industry action through the Association, to achieve the necessary balance required today between government control and individual business and personal freedom. But this does not change the basic task of the National Canners Association in bringing to every member of industry the necessary information and technical tools of management to which Mr. Lucks and Mr. Free have referred.

Instead, the complex demands of operating a food processing enterprise today have broadened the need for timely, authentic, and reliable information. They have increased the vital necessity that the planning of the individual canner, and the development of industry policy and public recommendations, be predicated upon an informed judgment democratically achieved in full discussion. To the attainment of these objectives, the Association committees and staff have embraced the opportunity, now afforded, to focus N.C.A. effort upon the cardinal job of each canner—to pack a marketable volume of quality products at a decent profit.

This is not a wholly new approach but a long deferred return to N.C.A.'s principal task. Yet it must be approached against today's conditions and predicated on current production and marketing facts—not the more comfortable patterns of two decades ago. Every phase of your operations has been complicated by these changes I have so inadequately summarized.

Moreover, not only are the responsibilities of canner management more complicated and demanding, but today things move incredibly faster. The penalties of business error—of poor raw material selection—of low quality —of bad market judgment—fall with deadly rapidity.

Wisdom in top management is of course still vital. But alertness, knowledge, receptivity to new ideas and methods, and a better understanding of the whole industry, by everyone in the enterprise, are equally required for commercial survival and success.

The challenge to N.C.A.—its committees, officers, staff, and forgive my adding counsel—is even geater in this new and, we hope, more peaceful era. More ground must be covered to meet the obligation of keeping many more people fully informed—adequately armed to compete both within the industry and with other types of processing—and yet still to preserve the basic Association rule that all be advised but no one commanded.

The convention sessions beginning tomorrow reflect this return to the individual canner's interest in packing quality products to make a decent profit. But in their emphasis, as I have said, they deal with the business of canning under today's conditions, and with developments that must be known today for tomorrow's profitable operations. They are detailed and technical—as is the industry. They are comprehensive. No one man can attend and master them all. The same division of labor and the same degree of delegated operating responsibility you employ in your own business must now be applied to this intellectual smorgasbord of political prognostication, raw material purchase and controls, processing techniques, quality maintenance, regulatory compliance, and statistical evaluation. Sustenance can be found only by ingestion.

Taken together, the sessions are the result of many months of planning to develop a program that will afford to every man in every department of a canning enterprise the opportunity to be brought fully up to date. No business is stronger than its weakest production, quality control, research, or marketing link.

Of course, each of you is still largely in the hands of the federal government, and tomorrow Senator Taft will afford an illuminating insight into what the new Administration hopes to achieve in Washington.

The Saturday afternoon session on new processing methods and equipment hardly needs a lawyer's recommendation. I well remember what Mr. McDougal of Libby said 20 years ago—that any man in any company who did not appreciate that the methods and machinery employed today might be replaced in ten years, should himself be replaced today.

No canner can afford to neglect the scheduled meetings on raw products procurement and management. With increasing competition from other types of processing, the dual job of raw material acquisition and quality production is increasingly important. Yet raw product procurement and field management, to which two full sessions will be devoted, are encountering new difficulties. Collective bargaining by growers now poses and may create in the future formidable problems for canners who remain shackled by legal limitations on equality of dealing. Here what is lawful sauce for the grower is often legally hazardous for the canner. The discussion has major dollars and cents implications for every alert canner.

In Sunday's full session there will be given the latest information—with expert panel discussion—as to the impact of food and drug control of pesticides, questions of factory inspection, food standards, and related problems. Each of these is economically important to every canner.

Lastly, we live in an age of statistics. The intrusion of this mathematical science into every business judgment, and in the formulation of many governmental controls, is all pervasive. Men in every department of a company must became familiar with these new statistical techniques and with their arithmetic cousin, the art of sound cost accounting. The opportunity for doing so is offered on Monday.

To revert to my canning industry teacher, Frank Gorrell, he always taught us never to bite off more than one could chew. The fact that but only part of one session deals with merchandising does not mean that N.C.A. is unaware either of developments in that field or of the opportunity for presenting new information and fostering valuable discussion. Future convention sessions will, I believe, come to stres this function of bringing what you pack to the ultimate consumer and of meeting the industry promotional challenge posed by Mr. Free.

The canning industry has its poets and pessimists—some who think the Normandy in which they live is the fairest land of opportunity, and those who think the other fellow's business is necessarily more profitable and far less hazardous. A lawyer, however, is privileged to visit many industries, and to share their enthusiastic hopes and to learn their apprehensions for the future. All that I have seen contributes to my confidence in the future of the canning industry. The opportunities, as well as the challenges, it presents to each of you, encourage the belief that this industry cannot miss its target of abundant future prosperity.

HIGH TEMPERATURE-SHORT TIME PROCESSING METHODS AND EQUIPMENT

Continuous Agitating Retorts

By C. K. Wilson,
Food Machinery and
Chemical Corporation

In this age of jet-propelled planes and atomic bombs, we are constantly reading notices in the papers about new developments. A new motor car is born with greater horsepower than ever before; some new plastic compound is performing miracles; and the durable goods industries in general are all offering something new and different to the trades.

The canning industry also is constantly developing new products and new techniques in processing. We in the canning machinery manufacturing business are trying to keep abreast with you canners by manufacturing machines that will produce your products and maintain the standards of quality which you have established.

The FMC continuous pressure cooker and cooler line, sometimes referred to as the Sterilmatic line of pressure cookers and coolers, is an illustration of one of the numerous machines which Food Machinery manufactures, and which is developing into a standard method of *in-can* processing for general applications.

Quality

Every canner has developed his own standards of quality for his specific products. Some products require a definite time of processing in order to maintain the degree of texture desired. Other products, such as juices, require processing at relatively high temperatures and very short times just to achieve sterilization. In the continuous pressure cooker and cooler lines *in-can* sterilization is handled continuously, and each can is handled independently and automatically at speeds up to 450 cans per minute, and processing temperatures may be controlled as high as 270° F. if desired.

Independent handling means no nesting of the cans, and consequently every can receives exactly the same treatment and every can is processed alike. It is this factor that has made it possible to open a new phase in controlled quality.

Heat Transfer

The inherent design of the continuous pressure cooker line produces an agitation that materially affects time, temperature, and quality, and can best be explained with the aid of illustrations.

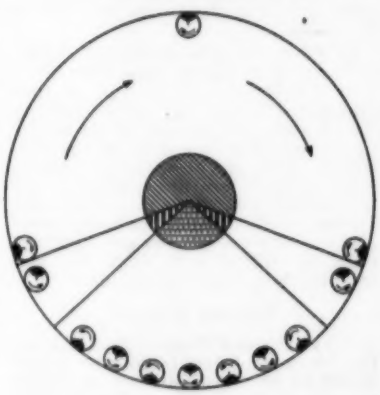
The cans enter the cooker shell directly from the closing machine through a valve which prevents the loss of steam pressure within the cooker. Cans are indexed into a revolving reel and advance through the cooker shell by means of a spiral mechanism while being subjected to steam which cooks and sterilizes the contents of the can. Each rotation of the reel produces a three-phase cycle. Figure I illustrates the travel of a can through one cycle and each rotation of the reel duplicates this action.

The travel of the can through the upper portion of the cycle permits a movement of the can about a central axis, thereby providing only a basting action. In the lower portion of the cycle the cans are actually rolling in the inner portion of the shell and the contents within each can are agitated. A small section between the cycle in the upper portion of the shell and the cycle in the lower portion of the shell is where the cans start and stop their rolling agitation. This is generally termed a sliding rotation. This three-phase rolling agitation comprises the action in the agitating type of reel.

There are, however, certain products which require very little agitation, and a special type of reel and spiral assembly is available, more commonly referred to as the non-agitating reel. In the non-agitating type of reel the cans are contained in a pocket-like arrangement, which still permits the cans to be moved continuously through the cooker and cooler, but does not allow the can to roll on the inside surface of the shell, but does permit the can to rotate about a central axis providing only the basting action.

FIGURE I

FMC Sterilmatic Pressure Cooker and Cooler Three-Phase Rolling Agitation



The types of heat transfer that are produced in the continuous cooker lines with various types of reels are illustrated on Figure II.

For solid packed products such as meats or pumpkin, there can be very little agitation, if any, even with the agitating reel. The type of heat transfer that occurs in this instance—regardless of whether the can is in a non-agitating reel or an agitating reel, or an ordinary vertical retort—may be referred to as conduction heating. The heat must travel to each successive layer of product in the can and thus be conducted to the center of the can.

If the contents of the can is fruit in syrup or peas in brine, then the liquid is free to move from one position within the can to another. Heat applied to the surface of the can quickly heats the liquid next to the can walls. Convection currents are then set up which move this hot liquid to the top of the can and replace it with colder liquid from the center of the can. Thus as the can is heated the convection currents move the liquid within the cans so that the product is more rapidly heated than would be the case in conduction heating.

If the product to be processed is handled in a continuous pressure cooker and cooler with a full agitating reel, the agitation that is produced will create movement of the product within the can. The degree of movement of the product is dependent upon the degree of agitation and the consistency of the product within the can. For products such as peas in brine which normally heat by convection, the amount of induced movement over and above the convection currents gives a more rapid heat penetration. For a viscous product such as cream style corn which normally heats by conduction, the movement of the product within the can induced by mechanical agitation will greatly increase the rate of heat penetration. This type of heat transfer is induced convection heating.

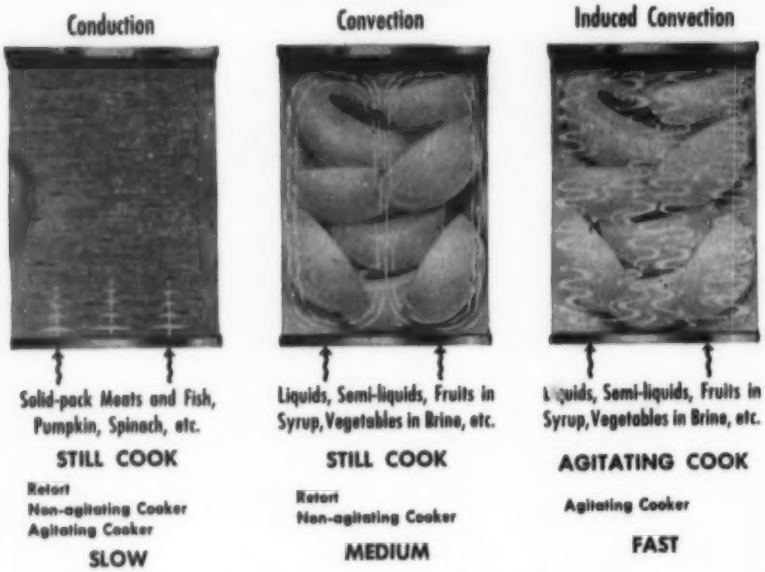
It is because of these special features that the FMC continuous cookers and coolers are capable of handling a wide variety of products and still maintain a desirable and lasting quality.

Engineering Features

The FMC continuous pressure cooker and cooler are constructed for long

FIGURE II

Types of Heat Transfer



continuous duty, extra heavy reinforced reels, valves and operating parts accurately machined. All pressure cookers and coolers are built in accordance with ASME code, thus providing safe dependable operation.

An ASME pressure type of rotary valve is used to feed the cans into and out of the pressure shells, providing a minimum loss of steam and air.

Centralized Control Board

All FMC continuous pressure cookers and coolers are furnished with control instruments. The mounting of these instruments as well as the external piping for steam, air, water, and electrical wiring system was until recent years the responsibility of the user. FMC now provides a centralized control panel as standard equipment. These panel boards are equipped with gauges for steam, air, water, and electrical controls, including starting switches, transformers, relays, safety switches, signal lights, and warning horns. These are all installed and integrated in the panel at the factory. Sufficient space is allowed for additional instrumentation that may be required for special controls.

Safety Features

In order to protect the FMC continuous pressure cooker and cooler line from getting jammed due to cans entering the line that may have been damaged previously, a number of safety control features have been added for the users' protection.

A. *Feed Valve Safety Clutch*—A safety clutch on the feed valve permits the elevator and feed valve to be automatically stopped without stopping the pressure cooker. This permits the cans within the cooker to continue their processing cycle while the elevator and feed valve remain inoperative.

B. *Automatic Reel Stop*—In certain installations particular rigid state control cooks are required and automatic reel stops can be provided that will stop the cooker if the temperature within the cooker drops as little as one degree below the control set point.

C. *Protector Stops*—Signal lights and warning horns have been integrated with protective stops so that improperly positioned cans entering the elevator or feeding device to the pressure cooker line will put the protector stops in operation. Cooling water signals are also provided and integrated with the protector stop system so that should the water level rise too high or fall too low lights of different colors will flash on and warning horns will be sounded.

Feeding Devices

A number of different types of feeding devices, more commonly called elevators or cup-feeds, are available to meet a variety of conditions. The most popular is the (a) left-side positive feed elevator that is used when it is desirable to raise the cans a few inches above the floor to feed them directly into the cooker. The (b) overhead positive feed elevator provides for a similar operation except that it is extended out in front of the cooker in the form of an arch and provides an aisleway where a battery of these cookers are used in any one installation. (c) Cup-feeds, a more recent development, can be furnished to feed the cans directly from an overhead conveyor system to the input valve or feed valve. The cup-feed is designed for high speed operation, and is also used to feed elevators. The design of the cup-feed provides for a minimum number of wearing parts, and when used directly connected to a feed valve provides a very compact, efficient, and high speed feeding unit.

Multi-grade Feed and Discharge

By the use of specially designed cup-feeds, two grades can be handled at the same time through one cooker line and can be discharged in the same relationship. This is a mechanical multi-grade feed and discharge which is simple in design and dependable in operation.

Can Sizes

The FMC continuous pressure cooker and cooler can be furnished in a wide variety of can sizes and for certain can size combinations. For example, some lines can be furnished to handle two can sizes without any change parts whatsoever, such as a No. 2 and No. 2½ can. These two can sizes can be run together or individually through the same line without any adjustments. Other combinations such as 300 x 407, 303 x 406, and 307 x 409 may be handled with only a minimum of adjusting. An additional can size could be handled to this combination such as the 307 x 306 by providing certain change parts. Other can size combinations are available. If we know your can size requirements, we can recommend most practical can size range.

Savings

The FMC continuous pressure cooker and cooler is a tool with which the canners can effect material savings in (a) steam, (b) water, (c) labor and (d) space.

(a) Exhaustive tests by our field engineers have shown that when comparing retort processing, that is, still cooks, with the FMC continuous agitating cooks on the same products, as much as 75 percent of the processing steam may be saved. With steam costing at around 75 cents to $1.00 per thousand pounds, this savings is no small figure. We have been advised of steam costs at much higher figures.

(b) Similar water savings are also possible. Water costs vary to a much greater extent than steam; therefore, it is necessary to know applicable water rates to determine savings. When necessary, specially designed coolers can be provided to further reduce use of water.

(c) Labor savings is of prime importance in the FMC continuous pressure cooker and cooler lines inasmuch as some of these lines are run at

speeds up to 450 cans per minute, and require no operators, and even on an installation where there is a battery of continuous pressure cooker and cooler lines only one attendant is required to check instruments and see that everything is functioning properly. For this small labor requirement it is easy to see that a substantial labor savings may be effected. Generally speaking, when comparing the continuous pressure cooker and cooler line to a retort operation, a range of from 7 to 15 men may be saved for each pressure cooker installation.

(d) The continuous cookers and coolers are relatively compact in design, and usually require only half the space of a retort operation on a comparable production basis.

Capital Investment

One of the first thoughts the canner has when considering an installation of this type is the initial cost—how much capital expenditure does one have to put out, etc. Initial costs are generally relative and should be compared with other means of accomplishing the same thing. Therefore, in making an analysis on this basis, it can be stated that in most cases the investment cost on a can per minute basis is comparable to other commercial methods of processing and in many cases the costs per can per minute are actually lower.

Research

Control of quality, heat transfer, and sterilization are recognized as important factors in the processing of any food product. Therefore, the first questions that may come to your mind are how to process a certain commodity in a continuous cooker and cooler to obtain desired quality. For what time and at what temperatures should a product be processed in order to secure sterilization as well as maintain quality?

For a number of years our Research Department has been at work compiling information on the processing of a number of products in continuous pressure cookers. A considerable part of this work has been done in cooperation with such laboratories as the National Canners Association and others connected with the canning industry. This work has consisted largely in the determination of thermal death-times of bacteria in various products, the rate of heat penetration for various products processed in continuous pressure cookers and the validation of theoretical processes by the use of inoculated packs. All of this work has been designed to give minimum processes which would adequately protect the canner against all spoilage hazards which might result in the underprocessing of a good clean product. The palatability and the over-all quality of most cooked products depends upon the tenderness as well as flavor. Tenderness is determined in part by the degree of cooking. Sterilization of some products in continuous cookers is so accelerated that it may be accomplished before the amount of cooking reaches the point desired by the trade. In these cases processes in excess of minimum sterilizing requirements may be desired and individual canners should determine his own process with respect to the required quality. In no case should his process be less than a minimum process required for commercial sterility.

Because of the special equipment and the trained personnel which we have in our Research Department, we are in a position to aid the users of continuous pressure cookers in determining their own process requirements. For example, because of the difficulty of obtaining rates of heat penetration in full-scale commercial equipment we have designed and built a machine known as a heat penetration unit which is used when the rate of heating of a new product is required. A comparison of our heat penetration machine and standard commercial equipment has been made by bacteriological methods and has shown that the agitation imparted by the commercial unit is closely simulated by the heat penetration unit. Since heat penetration alone may not give sufficient data to calculate the processes we have designed and built another machine known as the Thermoresistometer. This machine is used in our laboratory work to determine the thermal death-time of various bacteria in various products. With the information resulting from studies made in these two pieces of equipment it is possible to calculate a minimum process for most products. For a few difficult products this calculated minimum may be approximate. In order to validate this approximate minimum process it has been found necessary to use inoculated packs in full scale equipment under commercial operating conditions.

Summary

In this presentation I have tried to illustrate to you some of the points which are important and advantageous in a continuous *in-can* processing operation.

These features are:

(1) Quality through controlled high temperature and short time processes.

(2) Heat transfer types and advantages.

(3) Engineering features.

- (a) ASME shell and valve construction.
- (b) Centralized control boards.
- (c) Safety devices.
- (d) Multi-grade feed and discharge.
- (e) Can size combination.
- (f) Savings.
- (g) Capital investment.
- (h) Research.

Continuous Agitating Retorts

By R. W. Kueneman,
J. R. Simplot Co.

This process uses an entirely new concept in continuous thermal processing—*induced convection* instead of *conduction*. It makes possible the use of the short time-high temperature principal of sterilization of food in cans in continuous cookers. This is one of the most notable improvements in the history of canning cream style corn.

The process was first placed in commercial operation by the Simplot Company in 1949 for cream style corn.

Of necessity, conventional thermal processing subjects foods to high temperatures for specific periods to prevent enzymatic or microbiological activity during storage. Unfortunately, this heat treatment, especially in still retorts, results in some undesirable changes in color, flavor and texture of foods. Cream style corn especially is a product whose quality is adversely affected by such heat processing. This product's complex make-up of kernels, starch, protein and matrix solids provides an inherent resistance to conduction. Because of its heavy consistency it originally was thought that cream style corn could be sterilized quite as well in still retorts, by conduction heating alone, as in a continuous pressure cooker. It was thought that the product was much too heavy to lend itself to the agitation provided by the agitating continuous cooker. It was known also that, lacking movement of the product inside the can, it would be impossible for the continuous unit to sterilize the product by convective heating. And, after all, the sterilization problem was a simple one of thermal processing—proper cooking merely required a given temperature for a specified period for each different can size. Despite this, some corn canners and food engineers felt that it was possible to devise a new and automatic sterilization unit which would improve the quality of cream style corn.

It was discovered that the combination of product movement inside the can, imparted by the agitating cooker, and the movement of the headspace bubble resulted in intensive stirring of the corn. This product motion served

continually to renew the film of material in contact with the sides and ends of the can. It prevented overcooking and transferred heat rapidly from can-to-core by "mechanically induced convection." Through this mechanism of heat transfer the contents of the can rise in temperature more uniformly and in a significantly shorter time than in still retorts.

Advantages of Agitation

In addition to the marked improvement in bright natural color, flavor and texture of cream style corn, this advancement in food canning brought multiple advantages and savings:

(1) Uniformity of product quality, consistency and container fill.

(2) Steam savings to 60 percent or more.

(3) Labor savings with the "one man cook room."

(4) Time savings—less time required for cooking.

(5) Elimination of elaborate sterilization records of batches.

(6) Less can damage from repeated handling.

(7) Uniformity of cooking—no under- or overcooked product.

(8) No stack burn due to uncontrolled cooling.

(9) Less factory space requirements in relation to hourly output.

Credit for the development of this new mechanism of heat transfer is not due solely to thermal engineering. The problem was complex and required a corps of food engineers. The process could not have been developed without the research in bacteriology of sterilization; the role played by the new thermophile-free starch in controlling smoothness of the product and, also, the development of a practical consistometer for factory control. The fact that five corn preparation unit operations, and those of the filler and seamer had to be geared to the demands and operation of this process gives an idea of the preciseness of this operation.

Close Control Necessary

It is extremely important that operational specifications be met. Consistency of the product must not exceed maximum levels specified for the process. Cans must be filled with a gross headspace of at least one-fourth inch. The product must be moved through seven unit operations in a continuous, uninterrupted flow to the can seamer. A slow-down might result in the starch setting up prematurely and a loss of the product temperature required at the beginning of the process.

The precision required in preparation of the raw product and in can filling is itself a unique feature of this method.

There have been no outstanding changes in the design and operation of unit equipment which prepares and moves the corn, up to and including the can seamer. The novel features of the method are rather ones of progressive food process engineering, which has required the integration of the five conventional preparation units (batch mixer, pump, blending mixers, Dezurik consistency controller and blending mixer), meeting the precise demands of product consistency and temperature, the development of the new thermophile-free starch; the new FMC Consistometer and more accurate can filling equipment.

The outstanding achievement of this development is that these conventional units, now under precise control, have been harnessed to the Sterilmatic process. They now provide a prepared raw product with the exact specifications for automatic thermal processing by convection.

The processing steps up to the cutters are the same as those used in the conventional process and require no changes in layout. The corn can be blanched before cutting or not as the individual management may desire. However, close control should be exercised from this point of the process on.

Consistency Relationships

There is a complex relationship between consistency of the product going to the Sterilizer and cut-out consistency. In cut-out consistency, apparently the important role of the more finely divided solids in the matrix has not been widely recognized. However, maintenance of proper kernel characteristics requires that about 50 percent of the corn be in the form of kernel tops at the time of cutting. A wide variation in kernel content is incompatible with close control of consistency.

Increasing the percentage of solids which pass an 8 mesh screen but are retained on a 60 mesh screen appears to have little effect on the ingoing consistency, but at a given starch level, does increase the cutout consistency. This percentage must be kept within stated limits for the Sterilmatic process.

Significant increases in consistency have been obtained by pulping more mature corn through a 0.060" screen in the ratio of one cutter's output to that of seven or eight cutters handled conventionally. The actual results depend, of course, upon corn maturity and starch relationships of the particular corn being processed.

The combined grains and matrix are discharged from the cutters into a spiral conveyor and pumped to the silker. Consistency control starts at this point.

The successful operation of the process depends upon (1) uniformly accurate mixture according to specification, (2) accurate can filling, and (3) the continuous delivery of the filled closed cans to the continuous cooker at a minimum initial temperature of 180° F. The unit operations subject to these specifications start with the duplex batch-mixers. The additional ingredients added to each mix prepared in this unit control to a large degree the important factor of product consistency. Apart from its strong influence on the quality of the finished product, consistency must be regulated within limits that permit convection sterilization in the continuous cooker.

The duplex batch-mixer is a double tank unit, each having a capacity of 100 gallons. At Simplot's, two batch-mixers are used. In each tank a series of rotating paddles on a single axle thoroughly mix cut corn with the other ingredients.

These additional ingredients are preferably combined by mixing the water, sugar, and salt in a solution and adding the starch as a slurry. The solution is mixed in stainless steel tanks and flows by gravity, through sanitary piping. The slurry is handled in the same manner in a separate, agitated tank. The quantities of solution or suspension used in each batch are measured into the tank through a liquid-flow meter. The batch-mixer gives a semi-continuous operation; while the product in one tank is being mixed, the finished mixture in the other is being pumped to the blending mixers.

The brine solution and starch slurry go into the tank before the corn. When the corn covers the steam manifolds in the tank, steam is turned on and the mix is heated to a minimum of 180° F. When the 100 gallons of mixture reaches this temperature and has been agitated about 10 minutes, the batch is completed. Mixing for a shorter time or heating to a lower temperature results in inadequate removal of entrapped air and imperfect flow of starch. Consistency can be measured accurately in the batch-mixer only if the temperature of the mixture is at the optimum temperature, 180° F. Its consistency is then checked with a consistometer and it must register a reading of between 90-100 on this instrument. The batch is then pumped to a blending mixer.

Handling of corn mixture in quantities beyond the design capacity of batch-mixers and blending mixers tends to increase the air content of the mix. Excessive or irregular air content in the mixture at the time it is filled into cans increases the coefficient of fill variation.

Function of Starch

Normally added to insure smoothness of product, corn starch is a permissible ingredient in cream style corn. Canners' ordinary corn starch is not suitable to be used in this new

process. It will not produce a smooth, fancy grade product. Although some cream style corn is processed without added starch by conventional still retort operation, it is not feasible to do so using the Sterilmatic process because of the curdled appearance when the new type of thermophile-free starch is not used. Research in the mechanics of sterilization brought new discoveries of the important role played by starch in controlling smoothness. From this research use of the new thermophile-free starch was developed. It also paved the way for the development of a practical consistometer to be used for factory control of cream style corn.

This starch makes possible the induced convection process and the development of the consistometer makes the regulation of the process practical under commercial conditions.

The properties of the starch are such as to promote a desirable degree of smoothness to cream style corn processed in continuous agitating cookers. It meets the necessary physical properties and National Canners Association bacteriological specifications.

Starch requirements vary considerably for cream style. A larger quantity is required for very young corn, less with the more mature. The composition of ingredients of the batch also affects the amount of starch required. Usually about 10 pounds of this starch for a 100-gallon batch of corn will produce a smooth, creamy product. Cream style with a small amount of kernels may require more, but no specific formulations can be suggested since individual formulas vary widely.

Blending Operations

From the batch-mixer corn is pumped by a sanitary pump to the blending mixers. These units do four things: average the consistency and character of successive batches from the batchmixer; raise the temperature of the mixture; complete the starch flow and eliminate more gas, or air from the mix. The temperature of the corn in this unit is automatically controlled at 190-200° F. and the product remains in it for at least 10 minutes.

Preliminary product consistency control at the batch-mixer produces a mix easy to pump. It also reduces the load on the automatic consistency controller and promotes a more accurate control of consistency by this unit. Corn is pumped from the blending mixers to the consistency controller, which is completely automatic in operation. It regulates the amount of hot water to be added to the product to obtain a predetermined consistency.

A final blending mixing operation serves to level out the minor variations of the mixture and delivers to the can filler a product of precisely predetermined consistency and temperature. This mixer also serves as a reservoir to equalize the flow between corn cutting, mixing and can filling operations. In addition, it further eliminates gas or air from the mix.

As the product flows from the final blending mixer into the filler bowl, samples are tested at frequent intervals with the consistometer. Also, to assure that product consistency in the filled cans meets with specifications, test cans are removed from the line between the filler and seamer to be tested for consistency. A record is made of consistency, initial temperature and headspace variations for each test. Factory practice at Simplot's is to record this information at approximately 5-minute intervals.

Uniform Fill Required

Control of headspace is as important as consistency. It is this space, plus gases released by cooking, that produces the bubble that aids in automatically stirring the contents of the can. Filling specifications for this process require a minimum gross headspace of ¼ inch. The need for fill accuracy is accentuated by the fact that the ¼ inch gross headspace is reduced to approximately 1/16 inch when the cover of the can is sealed in place.

Recent studies made in connection with this new process showed the importance of the well-recognized can-to-can variations occurring in all fillers, when operated at excessive speed or under improper conditions. Such variations are not only uneconomical but they unnecessarily complicate the meeting of fill specifications.

The narrow spread between the maximum fill permitted for this process and the minimum demanded by federal regulations necessitates a can filler of a type, size and accuracy properly related to the desired line speed. Its coefficient of variation must be 1.0 or less. The filler used by the Simplot Company under commercial operation, has been a 12-pocket soup filler.

In addition to satisfying the requirements of this process, uniformity of fill has other advantages. It eliminates the hazard of illegally slack-filled cans, effects some economies in yield from raw product, and provides the salesforce another salestool when cutting cans for a potential buyer.

A clear distinction is made in this process between initial and final consistency. For purposes relating to the processing of cream style, initial consistency is that of the product at the time it enters the pressure cooker. Final consistency is that found in cutout tests.

Initial consistency is of the utmost importance since if it is too great the rate of heat penetration will be reduced and a longer sterilization process required. Tests made with the consistometer correlate initial consistency with the rate of heat penetration. The use of this instrument in a systematic routine fashion to regulate initial consistency at the filler is an absolute requirement for the successful processing of cream style by this process. Such consistency determinations are always made at the standard temperature of 180° F. Filler bowl product temperatures average 180-190° F.

After cream style corn has been filled into cans it tends to increase in consistency while standing, if not agitated. In addition, the initial temperature decreases. To avoid temperature loss and consistency increase, the product moves from filler and can seamer into the continuous cooker within 5 minutes.

Principles of Continuous Process

Until 1949 all cream style was processed in still retorts by conduction heating. The Sterilmatic process replaces these conventional retorts with automatic, high speed, agitating pressure cookers. The rotating motion is imparted to cans only as they are moved by the spiral reel across the bottom 90° sector of the unit. In the remaining 270° of the full spiral cycle the cans are carried by the reel in stationary position. This seemingly small amount of agitation both in the cooker and in the continuous atmospheric and pressure coolers is sufficient to stir the contents of the can and thus serve as a mechanism of heat transfer, by producing rapid convection.

The degree of stirring and, consequently, the rate of heating depend upon cooker speed. To insure proper product agitation during processing, there are certain minimum can speeds which are maintained for various can sizes. Commercial processes for two can sizes are:

TABLE I

Agitating Processes for Cream Style Corn

	211 x 304	303 x 406
Minimum gross headspace....inches	1/4	1/4
Maximum initial consistency.....	60	65
Minimum initial temperature....°F.	180	180
Minimum cooker speed....cans/min.	350	250
Processing time.....minutes	12	18
Processing temperature.....°F.	275	270

Precise time control of the FMC process is automatically controlled by the operating speed of the spiral that moves the cans through the automatic pressure cookers. In these cookers there is no retort steam come-up period—a thermal variable—and

each can receives precisely the same exposure to processing conditions.

Rapid Cooling Follows

In any short time-high temperature process rapid cooling becomes important. With this process each can is pressure cooled, beginning instantly after completion of sterilization. There is no variation from can-to-can or batch-to-batch as in retort cooling of cream style. In continuous pressure and atmospheric coolers the same agitation which permits rapid heating also serves to remove process heat rapidly from the product. This method is the one used by Simplot. The cans are transferred from the cooking to pressure cooling through valves of the agitating continuous cooker.

Following pressure cooling, the cans are further cooled by agitation in an atmopheric cooler to approximately 95° F. Cans are then conveyed from the cooler to the warehouse, where they are cased and stored. It is also possible to label the cans prior to the casing operation if immediate shipment is needed. In-plant chlorination provides control at this important point as well as in the rest of the process.

The much higher temperatures used in this new process required more accurate and rapid measurement and control of temperature than the conventional type continuous cooker. The instrumentation allows for accurate temperature measurement of the cooker within ¼° F. and for automatic control within the same limits.

Other Products

We also use the continuous pressure cookers for the processing of whole kernel corn, carrots, freestone peaches, purple plums, red sour cherries, and dark sweet cherries. In every instance we are able to take advantage of shorter process times and attain higher quality. We have been able to use the continuous pressure cookers for all the products we process within the applicable limits of can size.

During the corn season alone, savings in cook room labor amount to several thousands of dollars based on a 45-day season and two 10-hour shifts per day, with the elimination of ten men per shift. When comparable savings are added for the other commodities processed, the units justify themselves from a cost standpoint alone.

From a quality standpoint—and what processor can fail to ignore this factor in today's business?—the improvements are more than justified.

A few minor changes in air supply required and rearrangement of water lines were all that were necessary during installation, and if floor space is available, which would be necessary for any cook room using conventional retorting, there are no serious problems in converting to continuous processing.

In evaluating the process from a materials handling viewpoint and the over-all balance of process steps, this equipment has resulted in more than significant improvements in operation. It provides the balance wheel for a complex operation in our plant practices. During the corn season we run both canned and frozen corn as well as other canned, frozen and dehydrated products. Approximately 70 percent of our tonnage is put through the continuous cookers and as yet we are not at full capacity of the cookers. The smoothness and speed with which we are able to handle this tonnage means that we are able to keep up with field operations with ease and take up the peaks in harvesting. As a result, corn from the farm to the warehouse as finished merchandise will range in time from two to four hours. This, I am sure all will agree, is a high achievement in corn processing.

Aseptic Canning

By H. R. Goff,
James Dole Engineering Co.

I have been asked to review the present status of the Martin Aseptic Canning System. With respect to its application, what has it done and where is its place in the food processing industry?

Common information points vividly to the fact that the food buying habits of the average housewife have undergone drastic changes in recent years. The social evolution that has manifested itself in providing the housewife with broader fields of interest and activity has, as a corollary, placed an increasing emphasis on the *convenience* of foodstuffs—the form in which they are available. Also, as our national standard of living continues to mount, the average consumer's palate is increasingly discerning and discriminating. The result is an increased emphasis on the quality of foodstuffs. These considerations are causing canners constantly to evaluate their lines, with the knowledge that in today's market improved quality and increased convenience with respect to products will result in an increased demand.

It was the desire to make available new products in a convenient form and to improve the quality of certain existing products that stimulated the development of the Martin Aseptic System.

Samuel Butler during the last century said with considerable sagacity that "Every new idea has something of the pain and peril of childbirth about it; ideas are just as mortal and just as immortal as organized beings." The idea is the invention, the incitement. In the food industry those ideas that have won through the wearing pressures of survival during birth, infancy and adolescence have in combination brought about the great technical advances realized during the past 20 to 30 years. Seven years ago the Martin System was a laboratory phenomenon. Today with some 30 installations in the field we have cause to believe that we have cleared an initial barrier, finding acceptance in industry of a basic processing innovation.

Principle of Aseptic Canning

Probably many of you are familiar with the principle of aseptic canning, but for those who are not, a statement of its concept may serve well.

Earlier work had shown that in the thermal sterilization of canned foods, a short process at high temperature produces a finished product of better flavor, color and texture than an equivalent process at low temperature. It followed that the ideal process for the sterilization of canned foods would be to heat the product rapidly to the sterilization temperature, hold for the shortest time necessary for complete sterilization, and cool rapidly again to room temperature before filling.

Our work was undertaken with the object of developing aseptic canning equipment of simple design for operation with the various types of heat exchangers available for the short high-temperature sterilization of fluid products—equipment designed to capture the virtues of so-called "flash sterilization."

From this thinking evolved the present aseptic canning process and the specialized equipment to carry it out.

In the aseptic canning unit proper, empty cans are continuously sterilized in superheated steam or other hot gases at temperatures of from 450° to 600° F. and conveyed under a straightline valveless filling nozzle that discharges the product continuously into the cans in a filling enclosure maintained in an atmosphere of superheated steam or other sterile gas. The filled cans are conveyed to a standard closing machine which has been modified to permit maintenance of an aseptic condition by use of superheated steam. Covers are sterilized continuously in the cover sterilizing unit and are sealed on the containers aseptically in the closing machine. From this point the cans may go through a washer, marker and labeler and then move to a case packer to complete the operation.

All of the operations involved in the sterilization, filling and sealing of containers are carried out at substantially atmospheric pressure. The outward flow of superheated steam effectively prevents air-borne bacteria from entering the system. This counter-current principle not only obviates the necessity of mechanical valves for passing the empty containers and covers in, and the sealed containers out, of the system, but it also eliminates the necessity of pressurized construction in equipment.

Automatic Control Essential

The maintenance of adequate temperatures at every stage of the process is a critical factor in aseptic canning. To assure effective sterilization, the process, from holding tank to finished product, is under automatic controls, and temperatures are recorded. One temperature recorder documents the product temperature. Each of eight control points is provided with a thermocouple which registers temperatures on an eight-point strip-chart recorder and also provides a "run-record" which ties in with can filling operations. The product temperature recorder-controller is provided with a minimum temperature switch which is connected to a "ready" signal light and alarm system on the main control panel. If the process should fall below the pre-set minimum, the instrument turns off ready lights, closes the alarm circuit to a red warning light, and operates horn and can rejection mechanism in the runway between the closing machine and can marker, thus providing a physical safeguard against the coding and labeling of canned products which have not received an adequate sterilization process.

Advantages of System

In commercial operations where the process may be applied, it appears to have certain advantages over conventional methods, the most important of which are as follows:

(1) *Quality of Finished Product*—As mentioned above, the short high-temperature process produces a finished product of better flavor, color and texture than an equivalent process at low temperature. Vitamin retention is also higher than with conventional methods.

(2) *Large or Small Containers*—The quality of product is the same for large as for small containers irrespective of the heat-exchange properties (viscosity, consistency, etc.) of the product. Fruit and vegetable juices, purees, baby foods, soup stocks, pumpkin, tomato paste as well as other "difficult-to-process" items such as milk and milk products can be packed in large institutional size containers without sacrificing the quality advantages mentioned above.

(3) *Wide Margin of Safety in Sterilization Process*—The short high-temperature process used in the sterilization of the product has an extremely wide latitude between adequate sterilization and overcooking or scorching of the product, i.e. the process may be increased to double, triple or even ten times that required for complete sterilization without producing any appreciable difference in quality. This is a major advantage in commercial canning operations because it permits a wide margin of safety in the sterilization process without sacrificing quality in the finished product.

(4) *Control of Sterilization Process*—Sterilization of product in continuous-flow type heat exchanger permits direct measurement and control of the actual temperature attained by the product as it flows continuously through the system. The sterilization process is thus based on the actual temperature attained by the product rather than an assumed can center temperature. This is particularly important in processing products varying in viscosity and other heat-transfer properties.

(5) *Efficient Factory Operation*—The product is sterilized and canned aseptically as a continuous process, the product, cans and covers being fed into the system, and the finished sterile canned product discharged continuously to the labeling and casing equipment. Though offering a continuous process, the equipment is compact and results in factory floor space savings. The sterilization of the product in continuous flow heat exchangers results in more efficient use of both steam and cooling water. The high degree of mechanization with automatic instrumentation not only provides for close control of operations, but also results in important savings in labor.

Commercial Applications

A review of some typical operations being performed in the field by the Martin System will possibly be of interest.

(1) Several units are presently operating in the milk processing field on a wide range of products: fluid whole milk, concentrated milk, chocolate milk, cream, ice cream mix, and others. Some of the units are presently engaged in product development work, but quite a few are in commercial use at the present time. As an example, let us look at the production of canned fluid whole milk, substantially a new product in the market. As with certain other milk products it presents some difficult technical problems in handling. Aseptically canning fluid whole milk is a job for a qualified operator and certain processors using our equipment have developed their technique to a high degree. The end product is a sterile, stable milk free of any appreciable cooked or carmelized flavor that would normally result from longer heating at a lower temperature; a product that can be held for extended periods of time without refrigeration. The development of this product has captured the imagination of processors because of the great potential market that exists. One user of several commercial units of the Martin System has released figures indicating that in the early months of the present year he will be operating at a capacity of 41,000,000 quarts of fluid whole milk per year. The product is an excellent one and is now being exported to countries around the world, serving milk-short areas with a beverage milk.

(2) In the field of concentrated orange juice the aseptic canning equipment is finding important application. Following two seasons of product development and market testing work, the first high speed line is now being installed in Florida to operate during the current season. In this operation, juice identical with the frozen product is flash heated to yield a sterile, stable product in which the enzymes have been completely inactivated. Consumer and panel tests in comparison with the standard frozen product have indicated excellent acceptance flavor-wise. It holds interest for orange juice packers because evaluations to date indicate that it may be held and marketed at 40° F. without significant deterioration in quality for an indefinite period of time.

(3) During the past year the first installation was made in the plant of a cream style corn packer. I shall but mention this because we are fortunate in having with us as the next speaker on this panel Leo Weix, president of Oconomowoc Canning Company, at whose plant these packs were made last season. Mr. Weix is prepared to provide you with the operating details of this program.

(4) The field of heat sensitive products has also found important uses for the Martin System. In this group a good example is pureed banana, contemplated as a baby food and as an institutional product for ice cream or bakery use. Heretofore pureed banana has not been successfully packed; the effect of heat in a conventional sterilization process results in quality deterioration that does not afford a marketable product. The inherent characteristics of the aseptic canning system made it admirably suited for this food item and others of its type, and a product of excellent flavor, texture and color has been made possible. First units are now being installed for the commercial packing of this product.

(5) Soup manufacturers using the standard aseptic canning equipment first pointed out the need for certain modifications in design of the aseptic canning equipment. The necessity for handling products containing solid particles required that our fillers be of special design and that special

pumps be provided for such operations. Considerable work was done in this direction and the results were then applied to cream style corn processing. They will be extended to other areas where there is a departure from the liquid product and solid or discrete particles are present. Eventually the system will be designed to handle solid and semi-solid products that are now beyond its scope.

Various Capacities Available

Equipment currently being offered to the canning trade is available with various capacity and closing machine variations. All present machines are designed for use with either Continental Can or American Can closing machines. As development schedules permit, other closing machines will in all probability be adapted for use. The small capacity unit utilizes the single spindle Continental Panama or No. 006 American Can seamer for can sizes up to 404 x 700, permitting speeds up to 60 cans per minute, and the Continental PDS or 08 American Can single spindle seamer for can sizes ranging from 404 diameter up to and including the 603 diameter gallon container. This machine was the first model available to the canning trade and has been used somewhat extensively for both product development work and small scale commercial packing.

There are now being installed the first of several units of the large capacity equipment using both the Canco 401-4R four spindle seamer and Continental's CR four spindle machine. These Martin units are designed for can sizes ranging up to 404 x 700 with speeds up to 300 cans per minute in the smaller size containers. Change parts for use with any of the units give considerable flexibility with respect to container size.

In the earlier phases of commercially marketing the aseptic canning system, the availability of auxiliary elements of equipment posed certain problems. Sanitary pumps, heat exchangers and other equipment items were not designed for use with our specialized machine and accordingly adaptations were frequently made. With the expanded interest in aseptic canning and a clearer indication as to its place in the food processing picture, new auxiliary equipment is being developed and offered by qualified suppliers, equipment designed expressly for use with the Martin System. This development is a major step in the direction of a conventional operation and will mean a trending away from the specifically tailored installation.

Extension to Glass Containers

At the present time the equipment is being used commercially with tin containers. However, our present program embraces commercial application of apparatus for use with glass containers. In this work we have the assistance and technical cooperation of the Glass Container Manufacturers Institute and the member companies it represents. With metal cans we can safely heat the container to the neighborhood of 400° F. by subjecting it to high temperature superheated steam for 25 seconds or more during the sterilizing process. With glass, however, our problem is complicated because of the thermal shock that would be entailed when the container is filled with a cold sterile product. This has necessitated a departure from our standard equipment as used for tin containers. We have successfully completed the first phase of work leading to the fabrication of the prototype unit for commercial aseptic canning in glass. We have been able to sterilize containers and lids and cool containers in a continuous operation utilizing the basic aseptic canning principles worked out by us earlier. The completion of this phase of developmental work should open a considerable new field for the application of the system.

New Method Well Received

Actually, we are providing the food processing industry with a new tool. When and what better end products will be formed with this tool depends as always, in the last analysis, on the application of the ingenuities and capabilities that are possessed within the industry using it.

Our work at the present time is directed toward improving the effectiveness and efficiency of the machine. The unit being provided today incorporates the mechanical improvements that five years of experience have evolved. There is now available to the industry an effective operating unit that has made aseptic canning a commercial actuality.

It is a source of considerable satisfaction to us that canners who have worked with the Martin System and have evaluated aseptically canned products have displayed a high degree of enthusiasm as to the future of the process. As applied to a broad list of food items, they have generally recognized that through the use of this new canning approach there exists an opportunity for providing the consumer with new products and with a quality standard heretofore not attainable by so-called conventional methods.

Aseptic Canning of Cream Style Corn

By L. J. Weix,
Oconomowoc Canning Company

Although cream style corn has long been established as one of the more important packs of canned vegetables, Oconomowoc Canning Company did not enter the field until 1949. We well recognized the problems in producing a quality product that would meet the standards we set for our peas and whole kernel corn. Our search for new methods, processes and machinery, to obtain the quality we demanded, covered all available equipment for canning and processing cream style corn.

The newest method was the Martin Aseptic Canning System which has been introduced in the last few years to the canner. It offered a means of eliminating the processing in the can by taking advantage of short-time high-temperature sterilization of the product in a closed heat exchange system and filling it cold into a sterile can. Attractive features included continuous straightline flow of both the product and cans; low utility requirements; small space requirements; low manpower costs; and improved flavor, color and quality in the finished product. One feature of particular interest was the fact that because the corn was processed outside of the can, the finished canned product would have identical quality regardless of size of container used.

Samples of cream style corn put up in the Girdler Corporation's pilot plant in 1951 indicated sufficient promise to warrant our consideration of trying the Martin System on a production basis. The installation in our Sun Prairie, Wis., plant was the first unit placed in a cannery to pack products with discrete particles. We were happy to have the opportunity to be the first canner to try out and evaluate this new method of canning on cream style corn.

Equipment Requirements

All necessary equipment for the new process was installed prior to the corn packing season last year. It consisted of a Martin Aseptic Canning Unit, Votator heat exchanger, Waukesha pumps and electrical control system, utilizing Brown instruments. We removed a production line so that the new system could be placed adjacent to the established corn filling operations. Advantages of this arrangement are obvious. We were able to obtain a direct comparison between the two processes and fool-proof sampling of the same raw product canned by two different methods.

The cream style corn was prepared in the normal manner, put through a DeZurik consistency controller and piped so that it could be filled on the

standard line or put through the new system.

Some difficulty was encountered in the pumping arrangement in the new system, until the proper size pumps and pump speed were established to prevent kernel breakdown. By operating the pump impellers at slow speed, packs of several hundred cases were made which retained the kernel identity.

Method of Operation

The cream style corn was pumped through the first tube of the heat exchanger which was jacketed by 130-pound steam. A central rotating mutator which scrapes the stainless steel wall of the tube prevented burn-on of the product on the heat exchange surface. The product was heated from 180° to 285° F. in this tube and then held at that temperature for 30 seconds, as it passed through a 1½ inch stainless steel holding tube. A sterilization value (F_s) of 44 was thus achieved as compared with 5-6 obtained in normal retort operations. The product then passed through two more heat exchange tubes similar to the heating tube but jacketed with 60° F. well water. These units cooled the product to approximately 100° F., which was the temperature of the product when it was filled into the can. A continuous flow of sterile cold product was delivered to the Martin Aseptic Canning Unit.

The canning unit was set up to run approximately 32 No. 303 size cans a minute or the through-put of 2,000 pounds per hour which was the capacity of the particular model heat exchanger used. Empty cans were conveyed into the canning unit from our existing overhead can runway. As the cans passed through the can sterilizing section of the Martin unit, they were sterilized by superheated steam. Superheaters fired with propane gas and located within the unit raised 60-pound steam up to 475° F.

A helix worm drive picked up the cans from the can sterilizer and transferred them through the filling chamber, which was also kept sterile by superheated steam. The filling nozzle was a new type especially designed for cream style corn. A rocker arm, synchronized with the movement of the cans, actuated a knife edge divider which directed the flow of corn into the cans. This permitted positive control of the stream of corn flowing from the filling nozzle and eliminated all spillage.

Fill was adjusted accurately by changing speed of cans to suit continuous flow of product.

In line with the filler and also maintained in sterile conditions by superheated steam was a Canco No. 006 seamer which secured sterile lids on the cans. As they were ejected from the closed system the finished cans were cased and held for subsequent tests.

Pilot Operation Studied

Engineers from both the Girdler and Barnes organization supervised the operation of the equipment during the pack and worked closely with our production and technical personnel to achieve the results obtained. Dr. Martin of the James Dole Engineering Co. assisted in setting up the program prior to the installation of the equipment.

Although some problems were encountered that delayed the start of production, we were able to pack several hundred cases of both golden and white cream style corn. With the mechanical problems apparently solved, it is felt that a commercial operation is now possible on cream style corn with the Martin Aseptic Canning System. Some changes in formulation are necessary in the amounts of ingredients and the use of high temperature starch to obtain the optimum consistency and quality in the product.

Product Characteristics

Test cuttings of the aseptic pack to date show that the product produced by this method has a vast improvement in color by eliminating the characteristic brown or carmelized tint found in present in-the-can processed cream style corn. The Aseptic pack white corn has a remarkably white creamy color. Consistency is very good on the white corn, but the golden corn shows the need of either additional or a different type of starch than that used in our standard pack. A distinct "fresh" corn odor and flavor is apparent when the product is sampled.

We put up the experimental pack in 303 size cans but duplicate results and the exact quality would have been the same if we had packed in No. 10 containers. The Martin system should appeal to the canner not only from this viewpoint but also in its simplicity, continuous straightline flow, and economy of operation.

Cream style corn packed in the Martin Aseptic Canning System is definitely a new and different product. In the final analysis, the consumer will judge the merits of this new cream style corn.

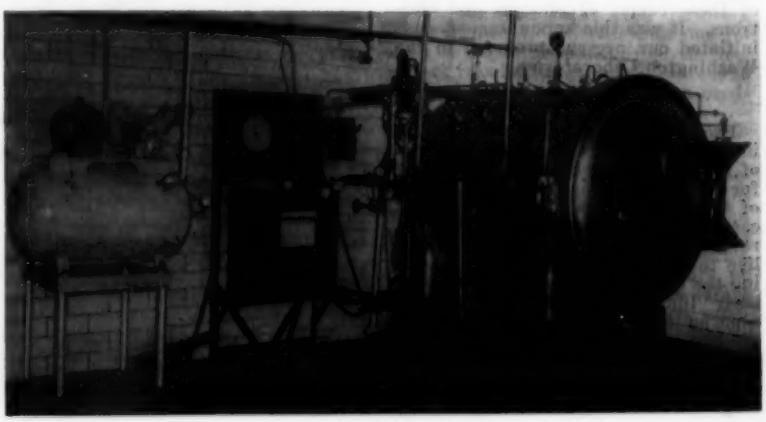
Film: End-over-End Agitation

Introduced by Weld Conley, Chain Belt Company

The Chain Belt Company has developed batch type pressure sterilizers which utilize the "end-over-end" method of agitation. This new method of agitating food products in the can during processing was first investigated by the Continental Can Company, and described by Dr. L. E. Clifcorn in a paper at the 1950 annual meeting of the Institute of Food Technologists.

Rapid heating and cooling resulting from this method makes possible short processes at relatively high temperatures. The corresponding improvement in product quality and the ability satisfactorily to process a variety of products in large cans, heretofore not possible, are the principal advantages.

The theory of "end-over-end" agitation, laboratory investigations, and commercial equipment are depicted in a color movie, entitled, "The Rex-Agi-Tort".



Sterilization by Atomic Radiation

By B. H. Morgan and C. W. Bohrer, Washington Research Laboratory, National Canners Association

The use of ionizing radiations to sterilize biological materials, with a resultant maximum increase in the temperature of the irradiated product of less than 2° F., implies a simple method of food preservation free of the detriments found in heat sterilization. Although this hypothesis is partially true, the problem is much more involved than appears at first glance. Before the process can reach the production lines of the food industry, the combined efforts of the chemist, physicist, engineer and biologist need to be liberally expended.

The concept of using ionizing radiations to sterilize microorganisms is not a new one, for as early as 1896, the year after the discovery of the X-ray by Roentgen, a paper appearad upon the subject of using X-rays to kill bacteria and proposed applications for this "new" method. Since that time, as our present day understanding of atomic physics and the electromagnetic spectrum has developed, other workers have reported various methods of sterilization by irradiations, such as the use of infra-red rays, ultra-violet light, X-rays, and cathode rays. It has been shown that infra-red rays are bactericidal through the production of heat, while ultra-violet light is usually limited to the sterilization of exposed surfaces.

During the past ten years an extensive study has been made at the Massachusetts Institute of Technology on the use of beams of photons and electrons, such as X-rays and cathode rays, to destroy microorganisms. These studies have indicated that materials may be sterilized by these forms of radiations. The radiations used in this work, however, were all from man-made sources. Recently the Atomic Energy Commission announced the possible future availability of certain radioactive materials as sources of these beams of photons and electrons. It was this announcement that initiated our present program in the Washington Laboratories.

Types of Radiation

From the viewpoint of the canning industry, there are three major types of radiations that could be considered for the sterilization of foodstuffs. All of these radiations are produced, according to current views, by rearrangements within the atom. I should like to spend several minutes reviewing the nature of these radiations and their limitations before presenting some of the results of our investigation.

If, for explanatory purposes, we visualize the atom as composed of a large center mass, or nucleus, and revolving around this nucleus in orbits much smaller masses known as electrons, we have the basis for understanding the sources of these atomic radiations.

If then the nucleus of a helium atom is stripped of the electrons revolving around it, and accelerated, the product is an alpha particle. Alpha particles are produced naturally by decay of radioactive materials, or by man in cyclotrons. Since, on a comparative scale, the alpha particle is such a massive unit, it is easily absorbed in matter and thus has a low penetrating power. As a sterilizing ray this low penetration power restricts its use to surface sterilization.

If, however, we do not touch the nucleus of the atom, but rather remove an orbital electron and accelerate it, the main product is a beta particle. A stream of these beta particles is called a cathode ray; these are produced naturally by radioactive decay or by man in electron accelerating machines. Although the mass of the electron is infinitesimal, compared with the alpha particle, its energy is also lower. This means that a cathode ray has a penetrating power greater than an alpha particle but has less killing effect per unit of distance travelled. The penetrating power of the beta particle is still limited, for where an alpha particle will be stopped by several sheets of paper a beta particle will be stopped by about a tenth of an inch of water. Thus the application of naturally occurring beta particles in the sterilization of foods is limited also by their penetrating power. This limitation may be less extreme in man-made cathode rays produced at high voltages in electron accelerators.

The third type of radiation is not considered a true particle, as are alpha or beta particles, but consists of the transfer of energy through space in units designated as photons. To return to our "ideal atom", if either the nucleus or one of the electrons receives an excess of energy from an outside source which results in rearrangement of the atom, a photon of energy is emitted. A stream of photons from radioactive decay is called a gamma ray while a stream of photons from an electrical apparatus is called an X-ray. These latter rays, the X-rays, possess only about 5 percent of the original energy used in their production and are thus relatively uneconomical. Although not as destructive to life as the alpha and beta particles, the gamma rays are much more penetrating, losing only about 50 percent of their energy during passage through four to six inches of water.

Thus, of the three types of radiations we have considered, the alpha particles and beta particles, or cathode rays are limited by their low penetrating power. The X-rays, although having high penetrative power, are limited by the wastage in their production. From a practical standpoint, then, the gamma rays produced from decaying radioactive material hold the most promise. Such gamma rays have been used in our experimental work, which will be described.

Source of Radioactive Material

The Atomic Energy Commission has indicated that relatively large amounts of crude radioactive material known as "gross fission products" may be available at some future date. These gross fission products are waste material from plutonium production reactors and emit all of the three types of radiation mentioned. Because of the limitations discussed it appears that the gamma rays emitted by the gross fission products will be of chief interest in sterilization. Gross fission products are not yet available for experimental work but in their absence, man-made "mock sources" of gamma radiation have been produced. These sources were described at the 1952 Convention by Bernard Manowitz of the Brookhaven National Laboratory. They are basically tubes of cobalt or tantalum that have artificially been made radioactive and which emit gamma rays during their decay. Such sources at the Brookhaven National Laboratories have been utilized in our work.

Irradiation Experiments

In preparation for irradiation, we produced spore crops of a number

FIGURE I

Types of Atomic Radiation

Type of Radiation	Point of Origin	Nature	Energy	Range
Alpha Particle	Nucleus	Heavy, positively charged particle	4–9 Mev.	2 Mev. 1.0 cm. in Standard air 0.2 Mev. 0.17 cm. "
Beta Particle (Cathode ray)	Electron	Light, negatively charged particle	0.1–3.0 Mev.	2 Mev. 840 cm. in Standard air 0.2 Mev. 37 cm. " 0.15–0.05 inches in water
Gamma Ray (X ray)	Nucleus or Electron	Electromagnetic radiation	0.03–2.6 Mev.	Reduce 1 Mev. gamma to ½ intensity in 350 feet in Standard air 50% loss of energy passing through 4–6 inches of water.

FIGURE II

Survival of Spores of Flat-sour #1518 Exposed to Gamma Irradiation Using Three Levels of Original Population

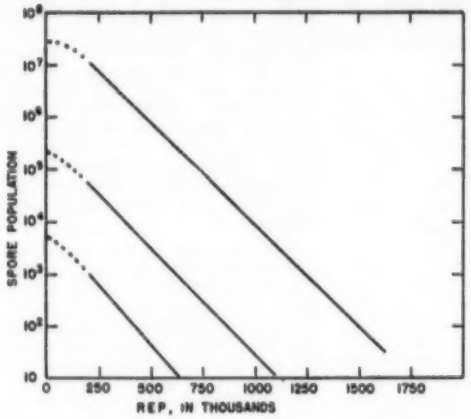
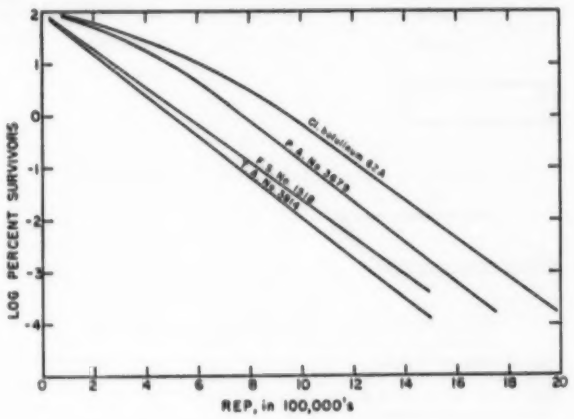


FIGURE III

Survival of Spores Exposed to Gamma Radiation



of organisms of interest in the canning industry, suspended them in phosphate buffer or pureed peas, and sealed them in thermal death time vials. These vials were then arranged into packets and taken to the Brookhaven National Laboratories, where they were subjected to gamma radiation from a cobalt 60 or tantalum 182 source. When the samples were returned to Washington they were assayed microbiologically.

The organisms irradiated included representatives of the putrefactive anaerobes, the flat sours, and the thermophilic anaerobes, as well as two strains of the food poisoning organism, *Cl. botulinum*. Of these organisms, irradiated in the spore form, *Cl. botulinum* was found to be the most resistant. Using an original spore population of 60 to 80 million spores per milliliter it took approximately 1,000,000 rep (in air) to destroy 99 percent of the population. However, it took another one and one quarter million rep to kill the surviving 1 percent. This would seem to indicate a selectivity going on while 99 percent of the population was being killed, resulting in 1 percent of the original population exhibiting unusually high radiation resistance. This being true, it would follow that the number of spores in the original population would govern the amount of radiation needed to provide a sterilizing dose.

To demonstrate this, three levels of original population of F. S. #1518 were irradiated at the same time and the survival curves plotted in Figure II. The amount of irradiation needed to reduce the population by a given proportion (i. e. 25 or 50 percent) was the same for all three levels of original population. However, the dosage needed to sterilize each of the three suspensions was directly proportional to the number of spores present before irradiation, the higher the contamination (spore population) the greater the sterilizing dose needed.

This relationship between original spore population and the amount of treatment needed to provide a sterile product is common to heat sterilization and irradiation sterilization. In contrast to this similarity is the apparent lack of direct relationship between the resistance of spores to heat and the resistance of spores to irradiation. Plotted in Figure III are the survivor curves for four typical spore suspensions. Of these four, F. S. #1518 is the most heat resistant and *Cl. botulinum* is the least heat resistant.

It cannot be assumed from these limited data that there always is an inverse relationship between the heat resistance and irradiation resistance of bacterial spores, as the spore suspensions in this work showing the greatest irradiation resistance, were also anaerobes. It may well be that the degree of anaerobasis in which a spore is produced, or irradiated, may govern its irradiation resistance.

Estimating Dosage Requirements

In foods to be sterilized by irradiation, the dose needed to achieve commercial sterility is a hypothetical point, as it is in heat processing. The estimated maximum population that is expected to contaminate the food, and the percent reduction of that population desired to reach "commercial sterility", will be the two main considerations in process determination. However, in heat processing the "test" organisms used always have a heat resistance noticeably greater than the heat resistance of any of the food poisoning organisms. From our work in which the food poisoning organism, *Cl. botulinum*, is the most irradiation resistant of those studied, it is apparent that a slightly different approach will be needed. Either an organism with more resistance to irradiation than *Cl. botulinum* must be found to be used in process determinations, or the process must be based on achievement of complete sterility.

Before the fission products can become industrially practicable the intensity of their gamma rays is going to have to be increased much more than 1,000 times. This will also result in a higher rate of irradiation per unit of time than is now being used with mock sources. We have tried to find out if this rate of irradiation would affect any of the above conclusions. Spore suspensions of several organisms were subjected to increasing amounts of gamma irradiation from three mock sources of varying intensity. The intensities of these three sources ranged from 27,000 rep per hour to 367,000 rep per hour and originated from either cobalt 60 or tantalum 182. The survival curves for all organisms exposed to the three sources were almost identical when plotted against total reps received. It seems fair to conclude that our results can be transposed from the low rate of irradiation cobalt 60 sources to those of the more intense fission products.

Requirements for Industrial Use

The cobalt and tantalum sources being used at the present time in sterilization studies are rated at one thousand to five thousand curies, the unit of measurement of radioactive decay. Sources of these intensities are so small in sterilizing power that before industrial utilization of fission products can become a reality, the intensity of the fission products must be raised to the megacurie, or multamegacurie level. The Vitro Corporation of

FIGURE IV

Estimated Source Strength Needed for Industrial Use of Fission Products

Form of Source of Irradiation	Weight of Material Irradiated	Total Curies Required	Total Time to Achieve a Sterilising Dose (2,000,000 REP)
Thin-walled Tube	5.72 lb/sec.	46,000,000	60 seconds
Thin finite plane	1.84 lb/sec.	66,000,000	60 seconds
Thick-walled Tube	5.72 lb/sec.	55,000,000	60 seconds

Conveyor speed of 6 ft./min.
Length of source 70.9 inches
0.75 Mev. gamma radiation

Courtesy: Vitro Corporation of America

America, in a study for the Atomic Energy Commission, has estimated the needs of a hypothetical industry using fission products for sterilization of a product on existing conveyor equipment. The Corporation postulated using the fission products in three different forms: (1) a thin-walled tube the inside of which would be covered with a thin layer of fission products and through which the product to be irradiated would be passed; (2) a thin plate upon whose surface the fission products would have been deposited and over which the product to be irradiated would pass; (3) a thick-walled tube made entirely of fission products through the center of which the product to be irradiated would pass. Figure IV indicates the curies of fission products needed to sterilize the stated amounts of material in one minute with the assumption that the material has the same density as water and is slightly less than 6 inches thick.

It may be seen from these facts that we have a long way to go in increasing the intensity of the source of gamma radiation above today's 1,000 or 5,000 curie level before this method of sterilization can be placed on a practical, large-scale basis. This increase in the intensity of a source also increases precautions necessary to avoid injury to workers near a source. It is noteworthy that, in general, as cells become less specialized in a biochemical sense, they also become easier to kill by irradiation. If we were to plot, from the available literature, the resistance of various forms of life to irradiation, we would find that humans would be among the least resistant and the spore forming bacteria would be among the most difficult forms of life to kill. Figure V shows this by indicating that it takes almost 4000 times as much irradiation to kill spores of bacteria as is needed to kill a man. It will be up to the engineer then to provide safe means of installing these fission products in production lines with a minimum of heavy shielding.

FIGURE V

Comparative Resistance of Living Systems to Gamma Irradiation

Subject of Irradiation	*Estimated Lethal Dose*
Man	500 Roentgens (Whole body)
Insects	2500 Roentgens
Spores of Bacteria	1,500,000 to 2,000,000 Roentgens
Virus	1,000,000 to 4,000,000 Roentgens

Side Effects of Irradiation

Up to now we have considered only ways to sterilize a microbial population. If that sterilization process takes place in food, not only is the microbial life eradicated but other chemical reactions occur which can result in a decrease in the quality of the food. The immediate effect of these penetrating radiations is to sharply increase the number of oxidations and reductions that take place in the material. This can be controlled to some degree by adjusting the conditions of irradiation, such as temperature and chemical composition.

The natural food enzymes that are usually inactivated by a small heat shock, or blanch, using present preservation methods, appear to be much more resistant to irradiations, in general, than are microorganisms. Enzyme inactivation may require as much as 4 to 20 times the sterilization dosage. In addition, the inactivation dose varies for different types of enzymes and also for different environments. Thus there are reports showing that pure enzymes in high dilution are highly sensitive to irradiation. However, increasing the concentration of the enzyme, or reducing its purity, will increase its radiation resistance.

Vitamin and amino acids are also easily destroyed in pure, dilute solution, but the amino acids are practically unaffected by irradiation when they are part of a whole protein. It has been reported that 50 percent of the l-ascorbic acid in orange juice and 50 percent of the riboflavin in milk was destroyed by a dose of 750,000 rep. Flavor and color must also be considered, as demonstrated by an off-flavor produced in milk subjected to 100,000 rep and, although no off-flavor was noted in apple juice subjected to 1,000,000 rep, there was an increasing bleaching effect above 300,000 rep.

Thus the chemical effects of irradiation of foods resulting in changes in enzyme, vitamin, and amino acid composition, flavor and color, as well as the possibility of production of materials toxic to humans, must all be more thoroughly investigated. Such an extensive program calls for the efforts of many; for our part we have concentrated upon those factors that govern destruction by gamma irradiation of bacteria causing food spoilage or food poisoning.

In conclusion, it is clearly possible to free a food of all microbial life by irradiation, with no more than a slight increase in temperature. Thus the method meets one requirement of an alternative to heat sterilization. There are, however, other requirements and difficulties to be overcome before the method can earn consideration for industrial use.

First, there must be assurance that very large quantities of source material will be economically available, enough to apply radiation at many times the rates that have been used experimentally. Second, the problems of secondary effects, as on color, flavor, odor, and nutritive value, or lack of effect, as on enzymes, need solution by one means or another. And, of course, to be usable the method must impart no toxic or harmful properties to the food. These problems are under attack by various groups, but up to now they represent drawbacks as serious as any of those associated with heat sterilization. Until their solution is much further advanced, we are in no position to regard irradiation as a rival to our present methods of food preservation.

PRODUCTION PROBLEMS AND SPECIAL PRODUCTS

Performance of 0.25 Pound Electrolytic Tin Plate on Cans for Processed Food Products

By W. J. Mutschler,
Research Department,
Continental Can Company

Since the beginning of World War II the can industry in the United States has made major changes in the type of tin plate used for the manufacture of all styles of cans. The first government regulation to control the use of tin for the manufacture of metal containers was issued on February 11, 1942, and this initial conservation Order M-81 reduced the consumption of tin for can manufacture by approximately 40 percent. Since that time further tin conservation has been effected by changes in the tin coating weight used for the manufacture of hot dipped tin plate and the extended use of electrolytically tinned plate which was not used to any great extent prior to World War II. Whereas tin coating weights of 1.50 pound per base box or higher were used for most products prior to World War II, 1.25 pound plate (common cokes) was generally adopted for those products requiring hot dipped tin plate and No. 50 (0.50 pound) electrolytic tin plate or chemically treated steel, otherwise known as bonderized plate, was used for those products and those can units where corrosion was not a serious problem.

By the time hostilities had ceased in 1945, the canning and can manufacturing industries had gained considerable experience in the use of these so-called "substitute" plates for all products packed in cans. As controls were gradually relaxed, the use of chemically treated steel decreased and eventually was completely replaced by No. 50 electrolytic tin plate when controls ended on December 1, 1949. Furthermore, the canning and can manufacturing industries did not return to the use of hot dipped tin plate for many of the containers for which it was used prior to the war, and there was every indication that adequate shelf life could be assured for many products using the lower tin coating weight plates.

Consequently, when the Korean war began in June, 1950, the canning industry was still conserving tin, although not actually under any government regulations. With the possibility that these new hostilities would affect our tin supply, it was deemed necessary to stockpile tin in the continental United States and on January 27, 1951, new government regulations, M-25, were placed in effect to again conserve tin. Chemically treated steel or bonderized plate, as it was known during World War II, was no longer available; the lines for the manufacture of this chemically treated steel had been scrapped and considerable time and money would be required for the steel mills to set up new lines for producing this plate. Consequently, the new government regulation did not consider the use of chemically treated steel plate, but in order to avoid drastic reductions in pack volumes, specified the use of No. 25 (0.25 pound) electrolytic tin plate for cans for the less corrosive products where No. 50 plate was then being used. Fortunately, experimental packs of cans made from No. 25 plate had been started as early as February, 1943, and there were experimental data to show that the use of No. 25 plate for many products would not be hazardous. Furthermore, No. 25 plate had been used for the manufacture of dog food cans since early in 1947 and the experience gained in the manufacture of these cans had shown that this plate could be properly soldered, that the shelf life of the product was satisfactory, and that the cans would have adequate external corrosion resistance, particularly if outside enameled. Experience in the use of No. 25 electrolytic tin plate had also been gained by using it in the manufacture of cans for beer starting early in 1949. This experience was particularly valuable since the side seams of beer cans must withstand considerably higher pressures than those of cans used for processed food products and conditions under which beer is handled are often conducive to external corrosion.

The examinations of laboratory test packs had shown that wherever No. 50 plate had been used for mildly corrosive processed food products, No. 25 plate could be used without any apparent reduction in shelf life. The experience of the past two canning seasons has confirmed the laboratory findings and, in general, there have been few if any instances of product quality being adversely affected by the use of No. 25 plate where No. 50 had previously been used. As is the case when any major change is made in a material used in container manufacture, that material is, logically or not, the first suspect in the event of any unusual difficulties developing with the pack. No. 25 plate has been no exception to this generalization. During the 1951 pea pack several canners reported somewhat more sulfide staining on the ends of cans made using No. 25 plate than they believed had been noticed during the previous year's pack when No. 50 plate was used. In most cases it was found that with proper control of packing practices staining was not a serious problem and such complaints were practically nonexistent this past season.

Concern was also expressed regarding the variation in brightness of No. 25 plate when it was first used in processed foods, since many canners thought that this might be an indication of lack of tin coating which would result in failure of the containers. Although some of these early complaints may have been justified, it is probable that many of these variations in plate brightness were due to variations in the surface of the base steel, the tin reflowing operation or to any of a dozen other causes.

In using No. 25 plate during the 1951 season, the canners and can manufacturers were most concerned regarding the resistance of this material to atmospheric corrosion. Although experience had been gained by using such plate for cans for dog food and beer as well as many dry products such as coffee and shortening there were no facts to indicate that either ends or bodies could be used plain outside under all conditions of packing and storage without some rusting. Consequently, the can manufacturers recommended that all No. 25 ends be enameled outside although they believed there was every possibility that plain ends would be satisfactory. However, the substantial cost savings to the canner in using such ends plain outside encouraged many to either use plain ends on a substantial portion of their 1951 pack or in some instances decide to use ends plain outside for their entire pack. Some canners also used enameled bodies, but since the likelihood of corrosion was considerably less on bodies than on ends, most packers used bodies plain outside.

The 1951 pack was watched very critically by canners and can manufacturers alike since the performance of No. 25 plate cans during that season would indicate whether or not outside enameling would be required in the future. Both plain outside No. 25 ends and bodies appeared to be performing satisfactorily during the season, but it was not until the worst of commercial rusting hazards had been evaluated by observing warehoused packs during the winter and spring months, that it was possible to definitely conclude that it should not be necessary to outside enamel No. 25

TABLE I

Estimated Usage of Plain Outside No. 25 Ends for Cans for Processed Food Products

	1951	1952
	(percent)	
Vegetables	20	60
Fish	0	0
Meats	25	25
Animal foods	95	95
Specialties	25	70
Total	35	50

FIGURE I

External Corrosion of Ends under Temperate Storage

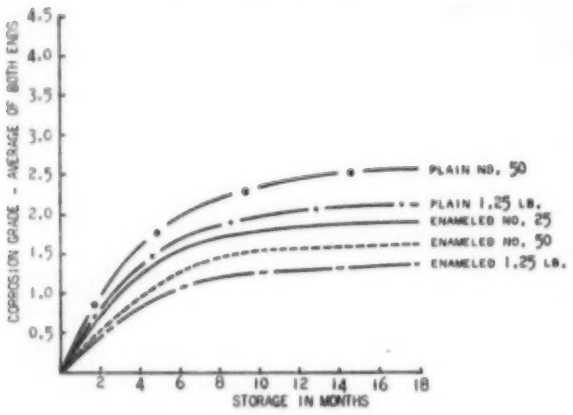
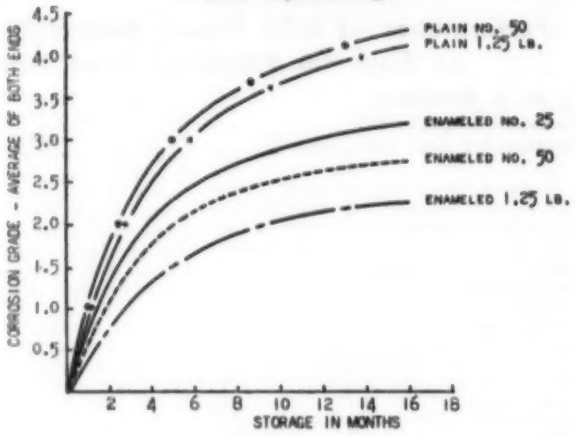


FIGURE II

External Corrosion of Ends under Tropical Storage



ends for processed food cans for domestic consumption. It was evident that plain No. 25 ends might rust somewhat more readily than plain No. 50 ends or plain hot dipped tin plate ends, but if conditions were conducive to rusting, any plain end would rust to some degree. The experience during the 1951 pack encouraged further use of plain outside No. 25 ends during 1952, as shown in Table I.

During 1952 it was possible to further observe the performance of the cans from the 1951 pack as well as to carefully check the quality of unused cans of 1951 manufacture which had been stored during the winter and packed during the 1952 season. These observations together with observations on the 1952 pack have confirmed the earlier findings that plain outside No. 25 ends are satisfactory except where improperly controlled canning or cooling practices are followed or when the pack is to be shipped to hot, humid areas.

During the period when can manufacturers were required to reduce tin usage for domestic cans, the armed forces were also faced with the prospect of stepped-up demands for canned foods, less tin available for their containers, and as great or greater corrosion problems than they faced during World War II. In order to determine if "pro-coating", or "post coating" as it is now termed, (enameling by dipping the finished can and drying) as used in World War II, or tin plate having tin coating weights higher than used for domestic containers were necessary to assure adequate protection, it was recognized that properly controlled tests should be made under typical field storage conditions to evaluate cans which conceivably could be used by the Armed Forces. In the autumn of 1950, a project was established in the Research and Development Division, Military Planning Division, Office of the Quartermaster General in cooperation with the Can Manufacturers Institute to evaluate cans made of various types of plate, including CMQ black plate and chemically treated steel, under actual field storage conditions. Several types of cans were included in these tests, but for the purpose of this discussion only the cans representing processed food containers are of interest.

The No. 2 (307 x 409) cans used in these tests were manufactured using chemically treated steel, No. 25, No. 50 and 1.25 pound hot dipped tin plate and the final packed product included post coated, precoated (enameled in flat) and plain cans except for the chemically treated steel (CTS) and No. 25 plates. Since no suitable seasonal packs were in progress at the time the manufacture of the cans was completed, they were packed with a heavy starch solution, which it was believed would be equivalent to a slow heating food product which could be expected to cause maximum condensation of moisture under adverse conditions. The cans were packed in solid fiber V-2 cases in a specified order so that all variables would have comparable exposure to weather, the cases fitted with sleeves, steel strapped and the cases arranged on wooden pallets in a predetermined order in two layers and the entire pallet load steel strapped. They were then shipped to four military test sites representing temperate, desert, arctic and tropical storage areas where they were stored out on the open ground with only tarpaulin coverings. A similar group of cans were stored at Maywood, Ill., and sample cans from each variable were also subjected to accelerated storage tests in laboratories in Chicago.

These cans have been examined at regular intervals during the past one and one-half years by qualified observers from the Research and Development Division, Office of the Quartermaster General, the Can Manufacturers Institute and the National Canners Association and have yielded many interesting results, all of which cannot be discussed here. However, two graphs have been prepared using the results of the examinations of the cans stored under temperate and tropical conditions which are of direct interest to us. Figure I shows the comparative rates of rust development on the ends of plain No. 50 and 1.25 pound plate cans and outside enameled No. 25, No. 50, and 1.25 pound plate cans when stored under temperate atmospheric conditions. Unfortunately, plain No. 25 plate ends were not included in these tests. It should be noted that the square of the "corrosion grade" is the approximate area of rusted surface, i.e. a corrosion grade of 3 indicates approximately 9 percent of the area of the two ends is rusted. This graph shows that corrosion resistance does increase with increasing tin coating weight; but even more clearly shows the advantage of outside enameling over increasing tin coating weight.

Figure II is similar to Figure I and illustrates the comparative rates of rust development with duplicate variables when stored under tropical conditions. The effect of the high temperature, high humidity storage is evidenced by the increased rates of rust development over those shown in Figure I. Similarly, there is a greater spread in the corrosion resistance of the outside enameled 1.25 pound plate ends and the plain No. 50 ends. However, the tests under tropical storage indicate even more clearly the value of outside enameling over increasing tin coating weight in order to assure

protection from rusting under adverse storage conditions.

It should also be mentioned that in these tests, although cans plain outside have shown considerable rusting after eighteen months' storage, even under the most severe conditions existing in the test, there have been no instances of can failure due to external corrosion. Furthermore, the last examination of these cans has indicated that there is little likelihood of any such failures developing during the final six months' storage period remaining before the completion of the test. It is true that the uncoated cans have a very undesirable appearance because of the rusted areas, but the fact remains that they have maintained their initial vacuum and any food product packed in them would still be in a satisfactory condition.

In summarizing the experience of the canning and can manufacturing industries with No. 25 electrolytic tin plate during the past few years, several conclusions can be drawn:

(1) No. 25 plate has been satisfactory for the manufacture of containers for the nonacid processed food products for which it has been used during the past two years both from an internal and external corrosion standpoint.

(2) For most domestic purposes it is not necessary to outside enamel No. 25 plate ends or bodies to assure adequate external corrosion resistance.

(3) For special end uses, such as for cans for export or for cans to be stored and distributed in localized areas where high humidity conditions will prevail or where the cans are subjected to severe treatment during processing or cooling, it is to the canner's advantage to use outside enameled ends, but there is no advantage from a corrosion standpoint to go to a higher tin coating weight without outside enameling.

Our experience these past few years encourages us to risk some prognostications regarding the future of No. 25 plate. From an economic standpoint, it seems very unlikely that plates having tin coating weights less than 0.25 pound per base box will be used by our industry, since outside enameling would be required and this would offset the savings effected by reduced amounts of tin. True, if tin savings must again be made, lower tin coating weights such as 0.15 pound per base box or 0.10 pound per base box would of necessity be considered, although for many products chemically treated steel (CTS) would undoubtedly be used for can ends and possibly for can bodies.

Economics could also force our industry to reduce, if not eliminate, its usage of No. 50 plate. No. 50 plate has little advantage from an external corrosion standpoint and from an internal corrosion standpoint is no more effective when enameled than is No. 25 plate for the ends of cans for those fruit products requiring plain tin bodies. The other uses where No. 50 plate appears to be required represent such a small percentage of the electrolytic tin plate produced that it may be uneconomical for tin plate producers to manufacture this plate and other available plates would of necessity be used.

No. 25 electrolytic tin plate is a relative newcomer to the canning industry, but its preformance during the past two years of commercial use indicates that it is here to stay.

Technical Aspects of 1.00 Pound Electrolytic Tin Plate for Processed Food Products

By D. F. Sampson, Research and Technical Department, American Can Company

When electrolytic tin plate became available in large volume about ten years ago, it was immediately recognized that heavy electrolytic tin coatings might well replace the hot dipped tin plate that had been used for canned food for many generations. The new product promised to reduce dependence on uncertain supplies of tin and afford economies that eventually would be reflected in the costs of canned food. There is deepening current interest in the use of tin plate carrying the equivalent of one pound of tin on one side and one-fourth pound on the other side which is now available commercially. This differentially coated plate uses 45 percent less tin than 1.25 pound hot dipped plate and has a lower cost.

Members of the Can Manufacturers Institute in collaboration with the steel industry and the canning industry made a study of the possible uses of light electrolytic tin coatings as a wartime conservation measure from which the use of #50 and #25 electrolytic tin coatings with inside enamel have become established as standard containers for many products. Use of these light tin coatings was predicated on provision of a corrosion shelf life equal to that of the hot dipped plate formerly used, or that the shelf life was so long there was very little possibility that corrosion losses would occur. The additional coverage of an enamel coating was essential for successful use of these electrolytic tin plates for processed food.

Enameled electrolytic plate could not be substituted for plain hot dipped tin plate for many products because contact with plain tin surfaces was needed to preserve the quality characteristics of the product, usually the color. In most instances, 1.25 pot yield basis tin plate carrying approximately 1.10 pounds of tin on the plate was found to be a suitable substitute for 1.50 pot yield basis plate carrying about 1.35 pounds of tin per base box that had been customarily used. There was a reduction in corrosion shelf life in direct relation to the decrease in tin coating, but several years' successful experience with the lighter coating has confirmed its adequacy.

The substitution of one pound of electroplated tin for 1.10 pounds of hot dipped tin was postulated as nearly equivalent because the former had less alloyed tin. Experimental packs did not confirm this expected equivalence of corrosion life. The initial experiments showed that in some instances the electroplated tin equaled or exceeded hot dipped tin coatings in the time for formation of hydrogen springer cans, but for the most part it was greatly inferior.

In his discussion before the technical session of the 1952 Canners Convention, R. R. Hartwell presented data in his Figure I illustrating this situation. This data showed that the shelf life of grapefruit juice in cans made of electrolytic tin plate did not exhibit the expected longer life in heavier tin coatings and most of the heavily coated lots had a shelf life less than half that of 1.25 hot dipped plate. This was the situation in 1943 for most products for which plain electrolytic plate was tried experimentally.

An understanding of the reason for failure of plain electrolytic tin plate to provide the expected shelf life was gained in part from consideration of some basic principles involved in successful use of tin plate containers for foods that react with tin and iron. The most important of these is that when the steel base is suitable for the food, the tin coating becomes anodic to the steel and is attacked preferentially. Very little hydrogen is released until substantially all of the unalloyed tin is dissolved at which time action on the steel proceeds rapidly and hydrogen springers are formed. Under such circumstances, the service life varies in relation to the thickness of the tin coating. Several known and other unknown conditions may interfere with this expected sequence of reactions within the can. The food product itself varies in its rate of attack over a wide range. Contaminants such as copper or sulphur may effectively eliminate the protection of the steel by tin. However, the most important factors that determine the corrosion life of canned foods are the corrosivity of the food itself and the characteristics of the steel base.

Research on the steel base for tin plate culminated in the mid-1930's in provision of steel produced to chemical composition specifications and by

FIGURE I

Tomato Juice

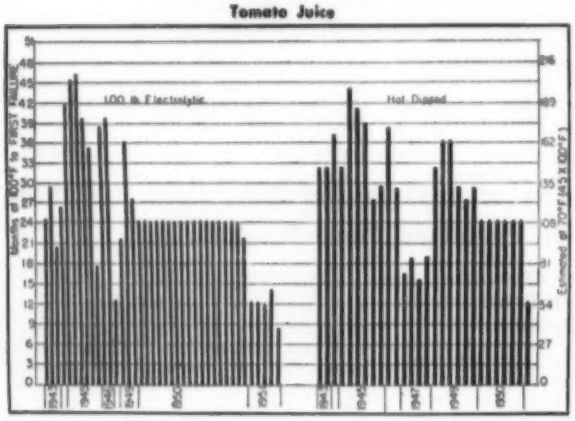
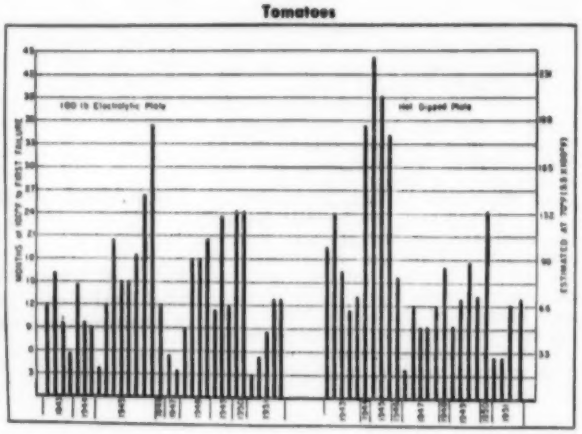


FIGURE II

Tomatoes



mill processing methods that provided ample service life for canned foods packed in hot dipped tin plate with very few exceptions. When the proper steel was used, the tin coating exerted its characteristic protective action and the time to form hydrogen springers was directly related to the amount of tin coating.

Even though the same steel was used for equivalent coatings of electroplated tin and hot dipped tin, the service life of the electrolytic plate cans was frequently much less than would be expected. Investigation of electrolytic plate that failed to provide the expected corrosion life disclosed that the condition of the steel surface at the time of tinning influenced the service life. When the surface condition was right, #100 electrolytic plate equaled or exceeded hot dipped plate.

Study of the steel surface ready for plating showed a definite relation between the rate of attack of this surface by acid and the hydrogen springer life of cans made from the tinned steel. Subsequently it was found that this surface condition could be influenced by the atmosphere in the annealing operation and other conditions of annealing. The rate of action of acid on the steel surface was a good indication of the extent to which this surface condition was controlled in the annealing of the steel and is the basis of a test for evaluating the steel prior to plating.

Another factor in addition to the aforementioned annealing factor appears to be associated with operations of the electroplating line since certain types of lines consistently give better than average results when the steel has been annealed by procedures that produce the desired surface condition.

Most of the tin mills have installed equipment essential to control of the annealing factor which influences service life. Only a few of the mills have the electroplating lines that produce an added degree of consistent corrosion performance. Since the steel industry is now in position to produce limited quantities of the lower cost #100-25 differential plate, the canning industry raises the question of replacement of a portion of current requirements for hot dipped tin plate by differential plate. The observations which follow will indicate that when the steel surface is suitable, a service life approximating that of 1.25 hot dipped may be expected for many products. The use of #100-25 differential plate this year will be determined by the extent to which plate of this quality can be produced.

The data from experimental packs of #100 electrolytic plate made by members of the Can Manufacturers Institute Research Committee have been assembled for study. Data contributed by Crown Can Co., Heekin Can Co., Continental Can Co., and American Can Co. have been plotted together on charts for an indication of the relative internal corrosion shelf life of plain #100 electrolytic plate in comparison with hot dipped tin plate for tomato juice, tomatoes, peaches, grapefruit juice, green beans, and pork and beans. In addition to this data obtained with the 1.00 pound coating, a much larger volume of data from tests of lighter coatings have been accumulated and analyzed, but is not included in this discussion.

Tomato Juice

Figure I is a bar graph of the time to first failure at 100° F. for each of the lots of plate experimentally packed with tomato juice. The 1.00 pound electrolytic lots are grouped to the left by year in which the test packs were made and the hot dipped lots to the right. Lots for which failures have not occurred during storage to date are indicated by a pointed bar of height corresponding to the storage time that has ensued.

The exact relationship between storage at 100° F. and 70° F. is somewhat variable, but from a large number of comparisons a median ratio of time at 70° F. to time at 100° F. of 4.5 has been derived. This relation is indicated at the right side of the chart wherein 54 months at 70° F. are estimated as equivalent to 12 months at 100° F. Although hot dipped and electrolytic plates both exhibit a variation of service life, the fact that practically all exceed one year at 100° F. is fair assurance that any of the 1.00 pound electrolytic plate could be considered safe for tomato juice. Commercial experience with substantial quantities of #100-25 plate during the past three years confirms this.

Tomatoes

The data for tomatoes of Figure II seem to be at variance with the usual concept of the relatively non-corrosive character of tomatoes. The short corrosion life of several electrolytic and hot dipped plate lots is due to low vacuum, which is common in canned tomatoes. For instance, the first two lots of electrolytic and hot dipped plate in the 1951 groups are in the same pack which initially had only one to two inches vacuum. Release of small amounts of hydrogen gas caused springer cans in a short time.

A large portion of the electrolytic plate lots had as long or longer corrosion life than the hot dipped plates. A trend toward more frequent occurrence of a shorter service life may also be typical of the various electrolytic plates used in these tests. Other data lead to the conclusion that if the annealing and plating factor previously mentioned is controlled in production of the electrolytic plate, there is not a great difference between such

FIGURE III

Peaches

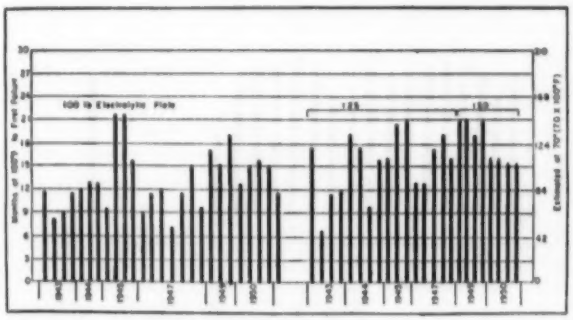


FIGURE IV

Grapefruit Juice

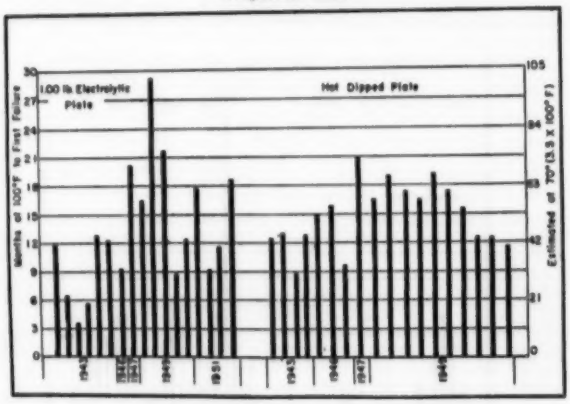


plate and hot dipped plate for tomatoes.

It should be noted that irrespective of the plate from which the cans are made, flipper and springer cans may be encountered during distribution if the initial vacuum is low.

Peaches

The data for peaches presented in Figure III show a more nearly comparable range of shelf life for electrolytic and hot dipped plates than for some other products. There is a trend toward lower values for the electrolytic plate. If the corrosion resistance reducing factors of the steel surface are controlled, almost full equivalance is obtained. For instance, the eight lots of electrolytic plate in the 1949, 1950, and 1951 packs were produced by methods that substantially eliminated the annealing process factor and provide the same shelf life as would be expected for 1.25 hot dipped plate.

Since peaches are a relatively corrosive product, it would be reasonable to restrict the use of #100-25 plate to that known to have the desired surface condition which assures electrochemical protection of steel by the tin coating. In effect, this would limit the plate available for peaches to that which can be adequately evaluated and classified prior to use. It is quite probable that the amount of classified plate would be sufficient for not more than 10 percent of the pack this year.

Grapefruit Juice

The packs of grapefruit juice made in 1943 appearing on the left of Figure IV resulted in a very short service life compared to hot dipped plate. Plate comparable to that produced in 1943 would be questionable for use. Packs made in 1946 and subsequent years have not had uniform service life fully equivalent to hot dipped plates, but the shortest service of both are comparable. Most of the lots of plate for these latter tests were made by methods that should provide a suitable surface of the steel. There is good indication that reasonable control of the steel processing will supply a plate almost equivalent in performance to the plate now used, but current use is dependent upon evaluation and classification.

Although we are concerned in this discussion with internal corrosion, we digress to note that citrus juices have not been packed in cans with plain #25 electrolytic plate exteriors, so development of experience under operating conditions of this industry may be needed to establish the suitability of external performance of outside plain #25 ends.

Green Beans

Green beans are one of the products that have a reactivity with tin that is not a function of electrochemical protection of steel by tin. The data of Figure V show that this reactivity may be more pronounced for electroplated tin. Many of the electrolytic plate lots have an appreciably shorter life than the hot dipped. This is not influenced by the steel surface condition to the degree that improvement of the steel surface is reflected in tests with other products. For instance, the three electrolytic plate lots in the 1949 group that failed in 12, 9, and 8 months were on steel processed to control one or the other of the steel surface factors. Hot dipped plate made from steel from the same three heats did not fail until 23 months' storage had elapsed.

Insufficient data are available for calculation of the relation between 100° F. and 70° F. storage but it is expected that the life at 70° F. would be between four and seven times as long, probably nearer the latter. This might seem to indicate a fairly acceptable shelf life at room temperature. Very little is known about the reason for the apparently greater reactivity with electroplated tin, which suggests that until sufficient evidence is obtained that there will not be excessively rapid detinning, an unknown risk would be assumed in use of plain electrolytic plate for green beans.

Pork and Beans

Relatively little data are available for pork and beans. The data of Figure VI suggest that the variable results of test packs of pork and beans may be due to differences arising from formula variations as much as variation of the plate. It would seem that the suitability of 1.00 electrolytic plate for this product and other formulated products such as spaghetti and soups would have to be determined by test packs of the specified formula.

FIGURE VI

Pork and Beans

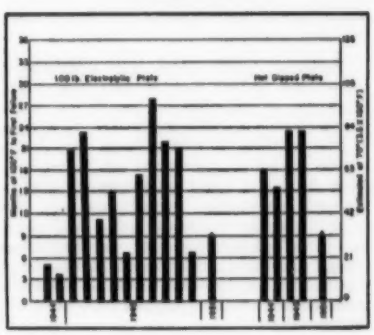


FIGURE V

Green Beans

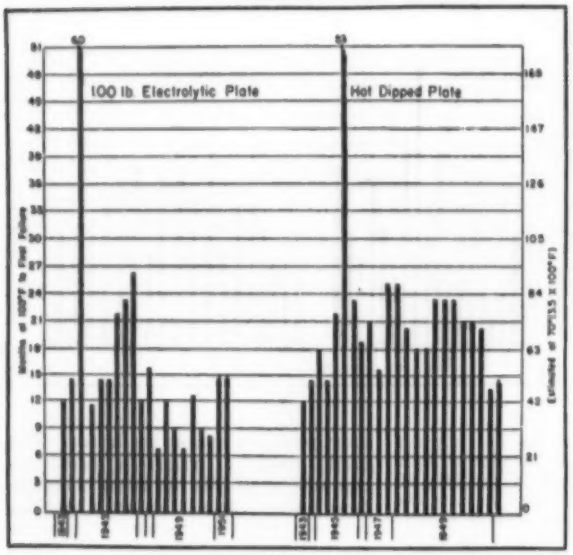
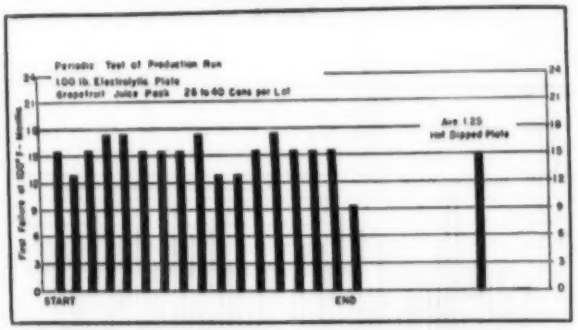


FIGURE VII

Commercial Pack of Grapefruit Juice



Commercial Experience

The data which have been presented in the charts have been derived almost exclusively from small quantities of plate produced for test purposes. Tests of commercial production are necessary to establish whether the processing of the steel in each mill will consistently control the steel surface conditions that are associated with a lower internal corrosion life for a portion of the electrolytic plate. One such test of a commercial production run is illustrated in Figure VII. Periodically during the run, sample sheets were selected, made into cans and packed at one time with grapefruit juice. The time at 100° F. to first failure for each of the sampling periods may be compared with the average of the hot dipped plates of Figure IV, shown as a single bar to the right. In this instance, the annealing operation was such that a consistent product comparable to hot dipped plate was produced. Similar tests have been made or are under way for other mills.

Several mills have not previously produced #100 electrolytic tin coatings on a commercial basis, so such tests have not been made for all mills. Until sufficient evaluation has been made of plate produced on a production basis, it must be assumed that a varied corrosion resistance of the plate may be encountered. Although a satisfactory product is expected from all mills, each needs commercial operating experience to establish suitable conditions for supply of a consistent product.

Summary

The Research Committee of the Can Manufacturers Institute has previously proposed the use of lighter tin coatings for tin conservation on the basis that the cans either had a shelf life equivalent to those in use or the life was definitely long enough to preclude possibility of failures during normal distribution. Plain electrolytic plate had not been suggested for use heretofore because of its variable and frequently short shelf life for most products. Research has disclosed that certain conditions of the surface of the steel are associated with the variable corrosion life of cans made of plain electrolytic plate.

Experimental packs have supplied evidence that application of this knowledge of the factors that improve the corrosion life of cans made of plain electrolytic plate may now permit use of #100 plate for some products. There are other products that are more reactive with electroplated than with hot dipped tin for which plain electrolytic plate may afford a risk of accelerated solution of tin.

New or modified processes are required to produce a suitable steel surface. Application of these processes on each production unit must be evaluated to determine whether the plate produced has the desired characteristics. With the exception of tomato juice, it is reasonable to restrict the use of #100-25 plate to such plate as is adequately tested and classified for its internal can corrosion performance. Plate suitable for whole tomatoes may be sufficient for a large portion of the pack this year. The amount of plate suitable for corrosive products such as peaches, fruit cocktail and citrus juice on the basis of evaluation for adequate shelf life may be sufficient for only a small portion of the pack.

Reference

Hartwell, R. R., "Technical Background for Further Tin Conservation," INFORMATION LETTER No. 1371, January 30, 1952.

Dietetic Canned Foods

By Franklin C. Bing,
Food Consultant

The new bulletin of the National Canners Association on *Dietetic Canned Foods*, providing as it does a wealth of new analytical data, practical suggestions to canners on general problems of production and labeling of these foods, and an epitome of helpful information about the usefulness of these foods in dietetics, represents a striking example of the kind of contribution to better health in which all members of the canning industry may take justifiable pride. The Joint Committee on Nutrition of the National Canners Association and the Can Manufacturers Institute, who are responsible for the initial planning and scientific guidance of this program of research, deserve the approbation for their execution of this assignment which I am sure they will receive. This bulletin, which already has been approved in principle by the Council on Foods and Nutrition of the American Medical Association, will take a permanent place in the worthwhile literature on applied nutrition.

It is my purpose, in the present paper, to offer additional comments about some of the subjects which are discussed briefly, and probably with

more authority, in the new bulletin. My objective is to emphasize some aspects of the subject to which individual canners might well give consideration in order to make more effective use of the information compiled by your Committee. The viewpoint from which my comments are offered is necessarily that of the nutritionist, but one who has been fortunate to have gained some insight into the problems of the practical business executive.

Dietetic Foods

First of all, the expression "dietetic foods," or, as it applies to the canning industry, "dietetic canned foods", is a new term and a good one. It is much more definitive than such terms as "foods for special dietary use" or "special purpose foods." It has none of the ill-repute which unfortunately was acquired by the term "health foods." By all means, strive by your production methods, by your advertising and merchandising operations to make the term "dietetic canned foods" mean the dependable, high quality, honestly merchandised and truthfully advertised products which they now represent. In that endeavor you will have the guidance of the Council on Foods and Nutrition of the American Medical Association, the constructive supervision provided by the laws administered by the Food and Drug Administration, and the cooperation of responsible scientific groups everywhere.

Dietetic canned foods are intended to be used in the feeding of the sick, and of those persons in otherwise good health but whose diet needs to be controlled with respect to one or more of the common nutrients of foods. The production and marketing of dependable dietetic canned foods represents an obligation assumed by the canner in response to a demand of the medical and dietetic professions.

From the practical point of view, we know that this demand for dietetic foods is large and that it will grow larger in the future. The life span is increasing, as we all know, and few persons in the upper age groups can afford to be indifferent to the quantity and quality of foods and beverages they consume. As medical science and knowledge of foods and nutrition continue to grow, the need for greater attention to the daily food intake becomes increasingly apparent for all ages of life.

The food manufacturer can be assured that not only does a demand for dietitic foods exist—a demand that will increase—but also that the production of dependable products affords business opportunities as well. Instances could be cited, for example, where producers of dietetic canned foods have gained new markets for their regular pack products by helping hospitals, institutions and grocery stores with their "dietetic foods section" to offer consumers what the physicians and dietitians recommend.

Dietetic canned foods have unique advantages in the formulation of therapeutic diets. Their quality is uniform, they are readily acceptable to patients, and their labeled statement of composition as revealed by analysis of representative samples of each season's pack by the individual canner can be depended upon. Their use facilitates the formulation of therapeutic diets which simulate closely the normal diet, in accord with modern practice.

The new concept of therapy by means of diet has been summarized in the following manner by Dr. Frederick J. Stare, in the introduction of Dorothea Turner's *Handbook of Diet Therapy*, published in 1952 by the University of Chicago Press under the auspices of the American Dietetic Association. Dr. Stare wrote:

"Intelligent diet therapy should be molded around a basic food plan selected to provide adequately the essentials of good nutrition but yet designed with consideration to the disease under treatment and the food habits of the individual patient."

This statement explains also why organizations such as the Council on Foods and Nutrition are interested in not only the sodium content of low-sodium foods, for example, but they are also interested in receiving reports of analyses to show that the particular food provides the other nutrients—the proteins, vitamins and minerals—which it is depended upon to supply. The first requisite in modern dietary therapy is that the diet shall meet the nutritional requirements of the patient. This can only be assured if each food selected for that diet provides the nutrients expected of it.

The Analyses of Dietetic Canned Foods and Their Interpretation

There is thus placed on the chemist a considerable responsibility to control operations during the canning of dietetic foods, and to provide the information needed for adequate labeling. It has already been stated that good manufacturing operations for the production of dietetic canned foods require chemical analysis of representative samples of each season's pack. Just how many analyses must be run depends on the variability encountered. The new bulletin discusses many details pertinent to the solution which each canner must seek for his own operations; in some instances, as the bulletin points out, it may not be feasible for a canner to attempt the production of low-sodium foods if his supply of cannery water is unduly high in this element and the situation cannot be corrected. Surely, in providing information such as the specific suggestions contained in this bulletin, the National Canners Association is assuming the type of leadership recommended by a Committee of the American Heart Association, whose unpublished report was made available to me through the courtesy of Dr. L. E. Clifcorn.

This brings me to a subject which is of immediate interest primarily to the scientific and technical advisors of the canner of dietetic foods, the question of the interpretation of analytical results.

Carbohydrates—The bulletin points out that the currently preferred method of computing the calories from the carbohydrates of foods requires the use of the figure for total carbohydrate by difference, plus the figure for crude fiber. There is ample evidence that the materials which comprise the crude fiber of fruits and vegetables are digested to an appreciable extent by the action of bacteria in the intestinal tract. Fatty acids are produced by this action, and these acids are absorbed and ultimately oxidized to yield food energy. Professor Atwater took the experimentally determined digestibility of foods into consideration when he developed his well-known factors for computing the caloric value of foods. Hence, the figure for crude fiber should not be discarded when the calories from carbohydrates are computed.

On the other hand, the diabetic specialist is interested chiefly in the sugar content and precursors of dextrose in foods. Crude fiber when digested by bacterial action yields calories, but not sugar. For use in diets for diabetic persons, the information of special interest is the so-called available carbohydrate. Unfortunately, there is no generally accepted method of measuring available carbohydrate, and more research is needed on the carbohydrates of fruits and vegetables. For most purposes, the available carbohydrate may be considered as "carbohydrate minus crude fiber." For this reason, the figure for crude fiber is of significance in food analysis as well as for other special purposes.

Admittedly this procedure runs into some anomalous situations when consideration is limited to individual foods. This is particularly a problem with fruits or vegetables that contain organic acids, some of which are converted to dextrose in the body. Fortunately, the errors involved in computing the available carbohydrate content of some individual foods are of little practical consequence when the composition of the diet as a whole is calculated.

Calories—The bulletin contains a discussion of the problem of the factors to be used in the computation of canned foods. For many years food analysts have been accustomed to use the Atwater factors, 4, 9 and 4. That is to say, each gram of protein and carbohydrate is computed as yielding 4 calories, and each gram of fat, 9 calories.

These factors are based on determinations of the calories obtained

when the individual foods are burned in a calorimeter, corrected for the losses in digestion and in the excretion of incompletely oxidized end-products of metabolism.

Within the last few years the validity of the Atwater general factors has been subjected to re-examination. It is generally agreed that for purposes of estimating the caloric content of a normal diet, or the caloric intake of a large population living on a varied diet, the use of these conventional factors is entirely satisfactory. Several writers, however, have stated that for the computation of the calories provided by therapeutic diets these factors should not be used. Instead, it is recommended that the specific factors for individual foods be employed. The compilation of analytical data in Agriculture Handbook No. 8, published by the Bureau of Human Nutrition and Home Economics, has made use of these so-called specific factors to compute the food energy values of the items listed in the tables.

The specific energy factors for the individual foods, used in calculating the caloric values of the tables in Agriculture Handbook No. 8, are not provided in that publication. However, through the kindness of the Bureau of Human Nutrition and Home Economics, a list of the factors which they used has been made available to me. The list for 1952 contains some changes from the list provided in 1950. No doubt the specific energy factors for some of these foods is subject to further refinement as more experimental evidence of their digestibility becomes available.

The point to this discussion is that the Atwater general factors—4, 9 and 4—were derived from the individual factors for each food, weighted according to the amounts of each class of foods contained in the customary diet. The individual factors varied, depending on the digestibility of that food. One gram of protein, in the form of eggs, yields 4.36 calories, while one gram of protein in the form of potatoes yields 2.74 calories. Each food or food group has its own experimentally determined factors for the calories provided by its protein, fat and carbohydrate. Instead of just three factors there are 110 factors listed in the compilation of specific physiological energy factors of foods, as compiled by the Bureau of Human Nutrition and Home Economics.

Atwater's data were not as extensive as the data available at the present time, but he did determine that the use of the 4, 9 and 4 factors gave results very close to the values obtained by the use of the specific factors for the individual foods. Most nutrition workers in the United States have followed the use of the Atwater general factors, except when special calorimetric studies were being made. While there is need for more investigation of the subject, as the Bureau of Human Nutrition and Home Economics has emphasized, the general practice today is to continue the use of the Atwater general factors.

I am inclined to follow this conventional usage even in the computation of the caloric value of therapeutic diets, for a number of reasons. The principal interest in the caloric value of diets is in connection with reducing weight, or in diets for increasing weight. Both of these therapeutic diets are similar to the normal or customary diet. I have selected a number of diets for weight reduction and computed the caloric contribution of each food in two ways, by the use of the Atwater general factors, and by the laborious process of making use of the individual factors for each food, as far as this is possible.

Typical results, as exemplified by the calculations of three different diets are as follows:

Reducing Diet	Calories General Factors	Calories Specific Factors	Difference Percent
A	1227	1197	2.5
B	1324	1299	1.9
C	1583	1558	1.6
Average			2.0

It is apparent that the error introduced by the use of the general factors amounts to about 2 percent for the daily diet. These particular diets contained appreciable salad vegetables, which give higher results when calculated in the conventional way. The actual differences in computations are probably somewhat greater in the cases selected than would be obtained with diets that contained less of these vegetables. The error introduced by continuing the use of the 4, 9 and 4 factors is thus seen to be small; moreover, the error would be to overestimate the calories, rather than underestimate them.

In the case of diets for healthy infants, also, the use of the conventional factors would be in harmony with the current teachings of pediatric textbooks and actual practice.

For these reasons it would seem that less confusion results if the older conventional factors are retained, even in the case of dietetic foods. The errors involved because of the lower values attributed to some foods are sufficiently balanced by the higher values attributed to other foods, as long as the diet approximates the normal pattern.

Thus we see that the subjects considered in the new bulletin on *Dietetic Canned Foods* bring us to the point where further recommendations must await the results of new experimental studies and additional experience in the use of these foods.

Re-use of Water in Canning

By W. A. Mercer and G. K. York, Western Branch Laboratory National Canners Association

Introduction

In the canning plant there is no substitute for an adequate supply of potable water. For this reason, canners in certain areas of the West are seriously concerned about dwindling water supplies. An expanding industrial program with its increasing demands for water indicates that shortages will become more acute and more widespread in the future.

The practice of water conservation by canners in these critical areas is an obvious necessity. Other canners, more fortunately located with respect to water supplies, can also profit from water saving procedures. Today the total expenditure for water is a relatively large and significantly increasing cost item. Similarly, the disposal of large volumes of liquid cannery waste is a costly and perplexing problem. Water conservation as a means of reducing the volume of water used, or the volume of waste to be disposed of, is a matter which deserves the consideration of the canning industry as a whole.

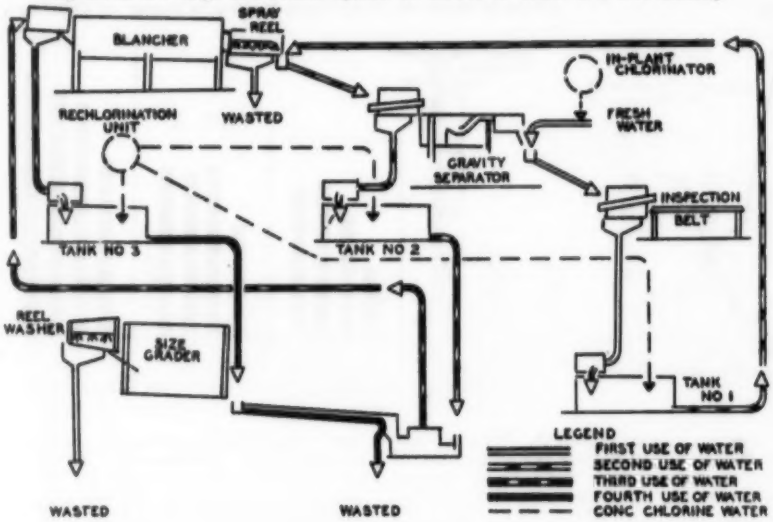
A recent survey of a large number of California canning plants (Doyle, 1952) indicated that re-use of all or a part of the water from certain operations would be the most practical way of conserving appreciable volumes of water. A number of western canners are now re-using water to a limited extent. Others are hesitant about extensive re-use of water, believing that it may be inconsistent with good canning practice. Before the development of efficient chlorination procedures, any re-use of water in contact with the product or for can cooling was discouraged.

The recovery of water from a canning operation for re-use, in the same or other operations, requires a consideration of the effect of this practice on the quality of the canned product, on general sanitation of the plant, and, especially, on the sanitary condition of the operation in which the water is re-used. Indiscriminate re-use of water has been responsible for costly spoilage losses.

Water conservation studies are a part of the research program of the National Canners Association Research Laboratory at Berkeley, Calif. During the past two years laboratory personnel have had an opportunity to make an extensive investigation of water re-use systems now operating in certain pea canneries. Of major concern in these studies has been the bacteriological quality of the re-used

FIGURE I

Diagram of a 4-stage Counterflow System for Re-use of Water in a Pea Cannery



water. The following general purposes have guided the investigation of this problem:

(1) To detect any condition or effect of water re-use which could be responsible for spoilage losses.

(2) To develop procedures for protection of the product against spoilage and any other undesirable result from water re-use.

It is the purpose of this paper to discuss the information obtained from these studies.

Description of a 4-Stage Counterflow System for Water Re-use in Pea Canneries

A general plan of water re-use in pea canneries is shown in Figure I. It incorporates desirable features and eliminates features which have been shown to cause trouble.

In such a system, the sequence in uses of the flume water is directly opposed to the progress of the peas along the preparation line. The greatest volume of fresh water enters the system as flume water for conveying the peas from the gravity separator to the inspection belts. This constitutes the final washing of the peas before they are filled into the cans. This water is collected and used for the second time in fluming the peas from the blanchers to the gravity separators. All collection tanks are equipped with automatic valves allowing a fresh water makeup for losses in volume.

The third use of the water is in pumping peas to the blanchers. Fluming of the peas from the size graders to these pumps comprises the fourth use of the water. At the pumps the water is drained from the peas through a grid, and wasted to the sewer or diverted to flumes for removal of wastes.

In a plant where the size graders are located at a higher level than is shown in Figure I, the water would be used for the fourth time in pumping the peas from the reel washers to the size graders.

Chlorination Procedure for Re-used Water

From the standpoint of good plant sanitation, water re-used as described must be chlorinated to control the bacterial population. Reference to Figure I will show the points at which chlorine is added to the water. An in-plant chlorinating unit maintains a residual of 5 parts per million gaseous chlorine in the fresh water. This initial concentration is quickly depleted during the first fluming operation and must be built up again by the use of a second chlorinator equipped with lines delivering strong chlorine water into the three collecting tanks. Thus, the water proceeds each time to its next use with chlorine residuals reestablished. The most economical, yet effective chlorine concentration to be maintained in the water at the rechlorination points results from a chlorine dosage which completely satisfies the chlorine demand of the water and allows a free residual of 0.1 to 0.5 ppm when tested by the orthotolidine method. Immediately after each use and previous to the next addition of chlorine, the water should contain a trace (0.01-0.05 ppm) of free residual chlorine.

For a cannery using an average of 1,500,000 gallons of water per 24 hours, the rate of chlorine addition at the rechlorination points would average 90-100 pounds of liquid chlorine per 24 hours.

At each contact of the water with the peas the concentration of organic material in the water increases, thus increasing its chlorine demand. Most of the chlorine added to the water quickly combines with the organic material to form chloramines, whose germicidal action is slower than that of free chlorine. In the water re-use system the contact time between the bacterial cell and the chloramines is sufficiently long to allow effective control of bacterial numbers.

Factors Affecting Bacterial Numbers in Re-used Water

Enumeration of the numbers of bacteria able to grow aerobically on glucose-tryptone agar plates at 86° F. (30° C.) is considered to be a reliable index of the sanitary quality of re-used water. For all practical purposes it can be assumed that any change in the physical or chemical nature of the re-used water creating a more favorable environment for growth of aerobic mesophilic bacteria would be indicated by increases in the numbers of bacteria. Such changes might include an increase in the concentration of organic matter used as food by the bacteria, or favorable increases or decreases in temperature. Likewise, any change in the water creating a more unfavorable environment would be indicated by decreases in bacterial numbers. Reductions in number occur when the concentration of organic matter is lessened by dilution with clear water or when the amount of peas to be washed by the water is reduced.

Factors which affect bacterial counts are as follows:

(1) *The chlorine concentration* of the re-used water has the greatest influence on the numbers of bacteria present (Mercer, 1951). A study of the curves in Figure II will show the correlation between increases in average chlorine concentrations and decreases in total numbers of bacteria. Counts are also plotted for a 24-hour period when all chlorination was stopped. Bacterial numbers rapidly increased until chlorination was resumed, the highest count being seven times higher than the average for counts made during chlorination. Foul odors and slime buildup quickly become evident when the re-used water is not chlorinated. Simultaneous sampling at corresponding points in canneries A, B and C, reusing water according to the plan outlined here, gave a striking picture of the effect of varying degrees of chlorination on total numbers of bacteria (see Figure III).

At plant A the incoming water contained an average of 5 ppm residual chlorine. Rechlorination occurred at three successive points as shown in Figure I. This water contained an average of 16,000 cells per ml. At

FIGURE II

Effect of Chlorine Concentration on Total Numbers of Bacteria per Milliliter of Re-used Water

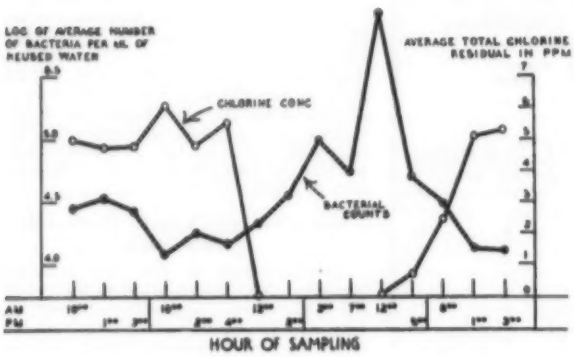
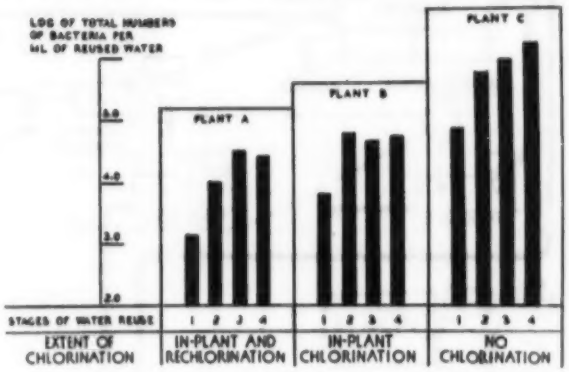


FIGURE III

Comparison of Average Total Bacterial Counts for Each Stage in the Re-use of Water at Three Plants Varying in Degree of Chlorination



plant B the water received only the initial chlorination. Here, the bacterial count averaged 37,000 cells per ml. At plant C, having no chlorination at any point, the average count was more than 800,000 cells per ml.

(2) *The rate of production* affects the bacterial numbers in the re-used water. Since the volume of water in the system is fairly constant, any increase in the number of cases packed per hour or day will mean a corresponding decrease in the number of gallons of water used per case (see Figure IV). As a result, more peas are washed in each unit volume of water with a resulting higher concentration of organic material, and thus more food for bacterial growth. Furthermore, an increase in organic material causes a decrease in chlorine concentration through its effect on the chlorine demand of the water.

(3) *Increases in the temperature* of the re-used water always result in higher bacterial counts. This is especially evident during the second use of the water when peas being flumed from the blancher to the gravity separator may still be hot. It should be noted in Figure I that a washing and cooling reel using fresh chlorinated water has been set in after the blancher. The water draining from this reel should be wasted.

Sufficient fresh water should be added at the collecting tanks to hold the temperature of the re-used water below 70° F. Otherwise chlorine losses from the water will be excessive and bacterial growth will proceed at a rapid rate.

Effect of Chlorination on the Quality of the Product

The use of a chemical agent in plant sanitation always causes concern as to its effect on the quality of the product packed. This aspect of chlorination received considerable attention during these experiments. In no instance could abnormalities in the appearance or quality of the peas be attributed to use of chlorine in the flume water.

In laboratory experiments, fresh peas exposed to an initial chlorine concentration of 5.5 ppm for 1, 3, and 10 minutes showed no bleaching of color. Peas exposed to 12 ppm for 10 minutes showed very slight bleaching. Samples exposed to 50 ppm showed no apparent bleaching after 1 minute, but after 3 minutes were noticeably faded in color. The samples exposed for 10 minutes to 50 ppm showed no greater amount of bleaching than the samples exposed only 3 minutes.

This is explained by the fact that all free chlorine had disappeared at the end of 3 minutes. The remaining chloramines did not have the bleaching effect of the free chlorine. No

FIGURE IV

Effect of the Rate of Production as Measured by Numbers of Cases Packed per Hour on the Gallons of Water Used per Case, the Chlorine Residual and the Numbers of Bacteria per Milliliter of Re-used Water

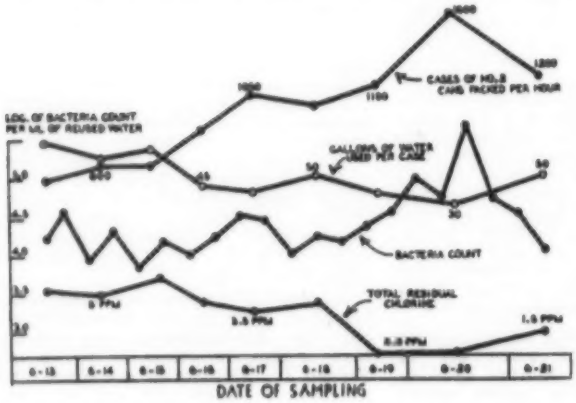


FIGURE V

Comparison of Bacterial Counts on Unchlorinated Re-used Water to Show Lack of Correlation between Total Numbers of Bacteria and Number of Thermophilic Spores

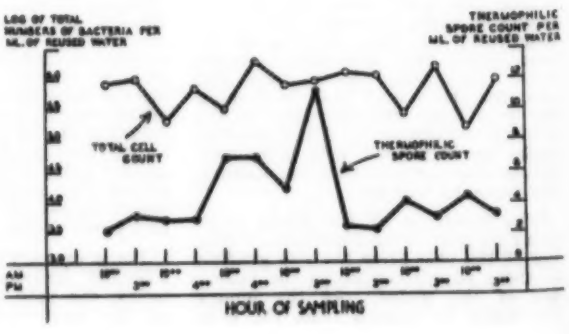


FIGURE VI

Effect of Blancher Contamination on Thermophilic Spore Counts per Gram for Peas Sampled at Successive Points on the Processing Line

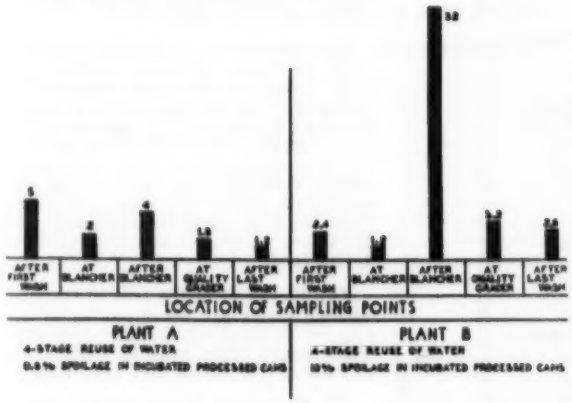
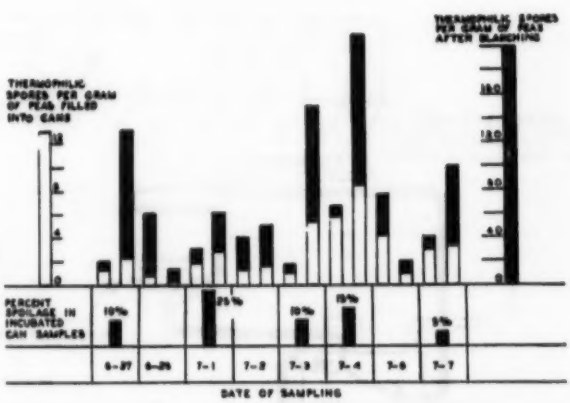


FIGURE VII

Relationship of Blancher Contamination to Flat-sour Spoilage in Incubated Processed Cans



off-flavor or off-odor could be detected in any of the test samples given the regular process.

Effect of Water Re-use on Numbers of Spoilage Types of Bacteria

In an estimation of the spoilage hazards involved in water re-use, the numbers of thermophilic flat-sour spores are of most significance.

In these studies no evidence was found to indicate that water re-use according to the counterflow system outlined in Figure I caused an increase in the number of flat-sour spores on the peas. Conditions which caused an increase in total numbers of bacteria per ml of re-used water did not result in a corresponding increase in thermophilic spore counts (see Figure V).

When the only source of thermophiles was the spore load on the peas coming in to the plant, fluming of the peas in re-used water gave a remarkable reduction in the number of spores per gram of peas. At one plant the peas entered the re-use system with an average concentration per gram of 5.1 spores able to survive 20 minutes in boiling water and grow in cultures at 126° F. Counts on the peas being filled into the cans averaged 1.6 spores per gram. Incubation of a series of processed cans at 126° F. for 7 days gave no significant amount of flat-sour spoilage.

The most serious condition found in bacteriological studies of processing lines arose from blancher contamination. However, in no case was blancher contamination caused or aggravated by the re-use of water. A series of counts at one plant showed that the peas were received at the blacher with an average of 1.2 spores per gram, while peas discharged from this blancher had a count of 32.6 spores per gram. The effect of different degrees of blancher contamination on spore counts at points before processing is shown in Figure VI. A definite relationship was established between the degree of blancher contamination and spore counts on the peas going into the cans. The seriousness of blancher contamination in terms of flat sour spoilage in incubated cans is shown in Figure VII.

As a means of minimizing the effects of blancher contamination, washing and cooling reels were installed in some of the plants surveyed. These spray reels used fresh chlorinated water which was wasted after this use. Studies on one installation showed that the use of 7 gallons per minute of water gave a reduction in temperature of the peas of 50° F., and reduced the average spore count 82 percent.

In only one instance was an increase in the number of spores observed as a result of growth in the re-used water. This occurred at Plant A where the blanchers were located at about the level of the size grader in Figure I. This necessitated pumping the blanched peas to the gravity separators situated on the highest level in the plant. The peas were discharged from the blanchers into washing and cooling reels which reduced the flat-sour spore count from 32 to 6 per gram, while the temperature was reduced from 200° F. to an average of 145° F. From the reel the peas were dropped into a short flume conveying peas to the pumps. This flume water was wasted through a grid before entering the pump. The peas were further reduced in temperature to an average of 95° F. However, during rush periods the ratio of peas to water in flumes greatly increased. The intermittent discharge from the reel also allowed clumping in the flume. These circumstances resulted, at times, in peas entering the pumps with temperatures as high as 134° F. The over-all result was a 6 percent increase in spore count on the peas during their passage from the pump to the gravity separator. Apparently thermophiles were able to grow and multiply in the pump and tubing.

Whenever possible, peas should not be pumped after blanching. If this cannot be avoided the peas should be cooled to 80° F. or below.

Bacteriological Studies on Recirculated Water

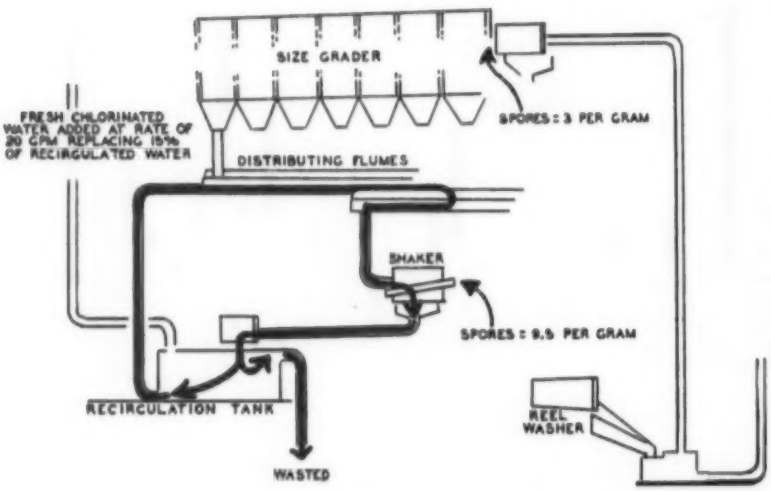
The re-use of water by means of the counterflow system must not be confused with conservation of water by recirculation within a closed or partially closed system.

A series of counts was made on a unit system which recirculated water through distributing flumes receiving peas from size graders (see Figure VIII). Peas entering the recirculated water had an average count of 3 spores per gram, while peas leaving the recirculated water had increased in count to 9.5 spores per gram. This increase in count occurred despite the continuous addition of 20 gallons per minute of fresh chlorinated water (5 ppm) to the system—an amount sufficient to replace 15 percent of the volume of water in the recirculation tank. Total bacterial numbers in this recirculated water were extremely high. Continuous passage of the water through equipment exposed to high air temperatures raised the temperature of the water to an average of 84° F.

The growth of thermophilic spore-forming bacteria under such circumstances seems a reasonable possibility. However, it is thought that the most

FIGURE VIII

Diagram of a Partially Closed Water Re-use System for Recirculation within a Single Line Operation



Average of daily counts shows the hazardous increase in spore load for peas washed by the recirculated water.

influential factor in this increase of thermophilic spores was the continuous concentration of spores washed from the peas.

The Volume of Water Saved by Re-use Systems

It has been estimated that the consumption of water in a pea cannery using fresh water in all operations would average 100 gallons per case of No. 2 cans. On this basis, the water re-use system discussed in this paper has been shown to reduce water consumption by approximately 50 percent.

Summary

The following points outline the most desirable arrangement and operation of a water re-use system in a pea cannery:

(1) The re-use system should employ the counterflow principle, that is, the sequence in uses of the water should be counter to the movement of the peas along the preparation line.

(2) Fresh water chlorinated to 5 ppm should enter the re-use system at the flume conveying peas from the gravity separators to the inspection belts.

(3) Tanks collecting the water after each use should be equipped with automatic valves allowing fresh water makeup for losses in volume.

(4) Provision should be made for re-chlorination of the water at the collecting tanks at a rate sufficient to satisfy the organic chlorine demand of the water and maintain a trace (0.05-0.10 ppm) of free residual chlorine.

(5) A daily series of chlorine determinations should be made on the re-used water in order to detect the need for adjustment of the rate of chlorine addition to correspond with variations in the organic chlorine demand of the water.

(6) The temperature of the re-used water should be maintained below 70° F. by dilution with fresh water if necessary.

(7) No recirculation of the same water within a single line operation should be permitted.

(8) Peas should be discharged from the blanchers into reels where they are cooled and washed by sprays of fresh, chlorinated water. This water is not added to the re-use system but is wasted.

(9) Pumping of peas still hot from blanching should be avoided. When pumping is necessary the peas should be cooled to 80° F. or lower.

Conclusions

(1) Chlorine in reasonable concentrations has no deleterious effect on the quality of peas flumed in the re-used water.

(2) The chlorine concentration in the re-used water has the greatest influence on total numbers of bacteria per ml of water. Close correlation exists between increases or decreases in chlorine concentration and decreases or increases, respectively, in bacterial numbers. The chlorine concentration has no measurable effect on the numbers of thermophilic spores in the water or on the peas.

(3) The rate of production as measured in terms of cases packed per hour influences the total numbers of bacteria in the re-used water, through its effect on the ratio of peas to water in the flumes. Increasing the amount of peas washed per unit volume of water increases the amount of organic material in the water, which in turn depletes chlorine residuals and furnishes increased amounts of bacterial food.

(4) Increases in the temperature of re-used water are accompanied by increases in total numbers of bacteria. This occurs when peas still hot from blanching are discharged into flumes.

(5) Extremely high bacterial counts on water recirculated in a partially closed system can be largely attributed to elevation of water temperature through continuous contact with warm equipment and heated air.

(6) No evidence has been found to indicate that re-use of water according to the counterflow system will cause hazardous increases in the number of thermophilic spores on the peas filled into the cans.

(7) Thermophilic spores were not found to grow or multiply in the water re-use system described in this paper.

(8) Blanchers were the principal source of thermophilic flat-sour spores found on the peas and in the re-used water.

(9) Studies on water recirculated in a partially closed system showed hazardous increases in the spore count per gram of peas washed by the water.

(10) In the absence of blancher contamination, flat-sour spoilage was negligible in incubated processed cans from plants practicing re-use of water by means of the counterflow system.

On the basis of the studies discussed, it is reasonable to conclude that re-use of water in accordance with the principles of the counterflow system is not hazardous with respect to deterioration of product quality or can spoilage losses, while it saves up to 50 percent of the water which would otherwise have been consumed.

References

E. S. Doyle, "Survey of Water Use Practices in California", Information Letter No. 1371, January 30, 1952.

W. A. Mercer, "Chlorination Studies on Reused Water in Pea Canneries", paper presented at Annual Meeting of Northern California Section of Institute of Food Technologists, 1951.

QUALITY PROTECTION AND FOOD REGULATION

The Supreme Court Speaks on Factory Inspection —Proposed Amendments

**By Hamilton Carothers,
Office of Counsel,
National Canners Association**

The program informs me that my remarks are entitled "The Supreme Court Speaks on Factory Inspection." I think that title somewhat deceptive. The Supreme Court may have barked once or twice and—from the Food and Drug standpoint—perhaps bit the postman, but it can hardly be said that the Supreme Court has given us a clear expression of its views on the subject of factory inspection generally.

Nevertheless, the recent *Cardiff* litigation and the events which have followed have highlighted and exposed once again issues of considerable significance to the canning industry. What began as a disinclination on the part of a single West Coast food packer to permit inspectors to enter his plant eventually emerged as an issue of sufficient governmental importance to warrant a paragraph in President Eisenhower's State of the Union Message to Congress. A brief review of these events will point up the present situation.

The owner and president of a dried fruit plant in the State of Washington —a Dr. Cardiff—had a history of disagreement with the Food and Drug Administration about the levels of spray residue to be allowed in his apple products. As a result of these difficulties, he made up his mind many years ago that no Food and Drug inspector would be permitted to enter his plant. I have never met the good doctor, but I would imagine him to be a man of considerable vigor. From some of the remarks made at the bar in the course of the litigation, I think we are entitled to the suspicion that if his lawyer had not supported him in his position, he would have found another lawyer. In any event, the doctor remained adamant, and in October of 1950 the government filed a criminal information against him for refusing to accord permission.

Most of you are aware of the interpretative problem with which this charge and its defense confronted the court. Prior to 1938, when the Federal Food, Drug and Cosmetic Act replaced the Food and Drugs Act of 1906, factory inspection was carried out on a purely voluntary basis. With the support of the great bulk of the regulated industries, authority was provided in the new legislation for inspection by FDA representatives of food, drug and cosmetic factories and warehouses.

It was thought at the time that Congress had legislated a compulsory right of factory inspection. As the Act finally emerged, however, it contained two sections which taken together left considerable doubt as to what exactly had been accomplished. Section 704 stated that employees of the Administration, "after first making request and obtaining permission" of the owner or plant operator, could inspect such plants "at reasonable times." Section 301, however, made it a criminal offense to refuse "to permit entry or inspection as authorized by Section 704."

The conflicting nature of these two provisions had long been the subject of comment by food and drug lawyers. In the only two prior instances—to our knowledge—where the factory inspection privilege might have become the subject matter of a court contest, the defendant pleaded either guilty or *nolo contendere*, thereby waiving his right to a court review. In the *Cardiff* case, however, the statutory provisions were subjected to a full frontal attack, with the eventual result a declaration by the Supreme Court that no compulsory right of factory inspection could be said to exist.

From a lawyer's standpoint, the *Cardiff* litigation had a number of interesting aspects. The first was the general recognition by all concerned that this was a test case. From the beginning, the defendant's attorney asserted his determination to carry the issue to the nation's highest court. The government attorney in effect admitted that they might as well get the meaning of the statute settled once and for all. And the District Court, which convicted the defendant, was so anxious to facilitate an appeal that it was considerably troubled by the amount of fine it ought to impose, fearing that too small a fine would not impress the Supreme Court with the significance of the issue for purposes of review yet acknowledging that the test case aspects of the litigation did not warrant the imposition of a severe penalty on Dr. Cardiff. The court finally decided on $300 fine, with a recommendation to the Court of Appeals that the fine be reduced in the event the conviction was upheld.

The other aspect of the litigation—and you will forgive me if I refer even briefly to matters which may be of primary interest to lawyers—involved the diligent straining by the various courts and parties to give meaning to a statute which one judge on the Court of Appeals described as "just plain nonsense." No legally trained mind readily accepts the proposition that Congress just didn't know what it was doing when it enacted these two sections.

Accordingly, in convicting the defendant, the District Court expressed the view that what Congress really intended by the language requiring the inspector to obtain permission was an effort to have the inspections made at reasonable times. Since the statute expressly declared that the inspections must be at reasonable times, this did not appear to offer a very sound explanation. On the other hand, the Court of Appeals, equally anxious to make some sense of the statute, while reversing the conviction, declared that in its view the two sections meant that an initial grant of permission was necessary before entry could be obtained, but that once granted the plant operator could not revoke it. This would mean that failure to permit entry after permission had once been granted would alone constitute the criminal offense. This view was, in the words of the Supreme Court, "pregnant with danger for the regulated business."

Still a third interpretation was urged by the defendant before the Supreme Court—that what Congress really meant was that if the owner or operator of the plant once gave permission, no subordinate employee of the establishment could thereafter refuse entry to the inspector. The government attorney quite aptly pointed out that things had come to a strange pass when the power of the federal courts had to be placed behind the owner of a business to enable him to achieve effective internal discipline in his own organization.

The Supreme Court finally chose not to take a position on any of these suggested reconciliations of the statutory language, and simply declared that, in any event, no one could be hung up by the heels on the strength of the hopelessly vague criminal notice that the present statute provides. With this decision—and the government's wise determination not to make an effort to keep alive any remaining issues such as whether or not permission had been previously granted—went the last vestiges of a Food and Drug compulsory right of entry.

Legislative Proposals

This nullification of the factory inspection right posed problems for industry and the Food and Drug Administration alike. Whatever differences of opinion may exist as to the proper scope of factory inspection, or the procedures which should be followed in making it effective, few if any members of the regulated industries can today deny that government inspection has become both an established and an accepted practice, with elements of protection for both

the consumer and the conscientious plant operator.

Furthermore, the loss of the factory inspection privilege involves more than the mere elimination of a single procedural step in the process of food law enforcement. Section 402 (a) (4) of the Act declares that a food may be considered adulterated "if it has been prepared, packed, or held under unsanitary conditions." Since some forms of contamination cannot be detected by the microscope or by any other method of objective examination of the finished product, the absence of authority to enter and inspect the plant premises places some forms of statutory violation beyond the reach of the FDA. In the drug field, many other provisions of the Act might be rendered a nullity without the factory inspection privilege.

Recognition of these facts prompted Commissioner Crawford to announce, immediately following the *Cardiff* decision, the FDA's intention to seek new legislation restoring the factory inspection right. On January 23, Senator Humphrey introduced a bill into the Senate incorporating the Administration's proposal for legislative revision. Like bills have since been entered on the House side. President Eisenhower referred in his State of the Union Message to the public interest as demanding "prompt specific action in protection of the general consumer." In early February, Mrs. Hobby, our new Federal Security Administrator, filed with both Houses of Congress a letter explaining the Presidential request to the Congress and urging the immediate adoption of the Administration's proposal.

The actual proposal offered by the Food and Drug Administration involves a relatively simple change in the present law. The language in Section 704—"after first making request and obtaining permission of" the plant operator—is to be eliminated and replaced by the words "after first giving written notice to." The proposed amendment would therefore eliminate the requirement for obtaining permission from the plant operator, and require only that he be served with written notice of the inspector's desire to enter. It is probable that this will result in the administrative employment of printed cards or other printed forms which would be handed to the plant operator by the inspector seeking entry—in effect, a mere formalization of the oral requests now made under the prevailing practice.

The need for this relatively minor legislative change, however, reopens many old issues and reemphasizes problems of considerable interest to the canning industry. It is no secret to either Mr. Harvey or to most members of this audience that there remain areas of forthright and respectful disagreement between the Food and Drug Administration and the regulated industries as to the scope of the inspection authority accorded by Section 704, and the procedures which may be or should be followed by the inspectors in the carrying out of their duties. Whether access to shipping records, quality control records, product formulae and complaint files is required under the statute, whether such evidentiary devices as cameras may or should be employed, whether the statute should be amended to require, or the practice adopted, that the inspector provide the canner with a written copy of his plant inspection report or of his sampling analyses, are questions on which the industry may not in every instance see eye to eye with the FDA.

Both the FDA and the regulated industries were quick to recognize that a potential area of controversy existed here. If "hitch-hiking" on the present legislative need were attempted by any party in interest, restoration of the factory inspection privilege might be indefinitely delayed. What has emerged, therefore, is a proposal which, in the words of the Administration, "should avoid needless controversy over the scope of the inspection authority" and which will "leave to the U. S. Courts the problem of saying how far the authority extends." In other words, most of the regulated industries, including the canning industry, have, for the immediate present, accepted the principle that the status quo should be maintained in all respects other than that precisely passed on in the Cardiff decision—and that neither the FDA nor the food and drug industries will attempt to take advantage of the present legislative need to reinforce their individual positions.

I might in passing refer to one last barrier to industry acceptance of the Food and Drug proposal—one which has recently been successfully passed. There exists a recognized legal principle that the reenactment of a statute after it has been construed by officers charged with its enforcement, without a material alteration of the part construed, may be an implied adoption of the construction, or at least is persuasive evidence of the legislature's approval of such construction. Certain statements of the government in briefs and at the bar, and perhaps the asserted position of the FDA in the past, might well have been brought forward at some future date as a means of making this principle effective. I do not mean to imply that the Administration intentionally made an indirect effort to confirm its interpretation of the factory inspection privilege through its sponsorship of the present proposal, but it is undeniable that a competent lawyer—and there are many such in the Food and Drug Administration—would have an additional weapon in his arsenal of legal argument in any future court tests of the section's scope.

To eliminate this last barrier, the National Canners Association requested of Mrs. Hobby a formal written confirmation of the industry's understanding of the Federal Security Agency's request to Congress—that it was limited to the precise point dealt with in the *Cardiff* case. Her response enables us to leave for another day and for other circumstances such questions as what the present statutory language authorizes in the way of factory inspection and what further amendments may be necessary to provide either more effective law enforcement or more adequate protection of the industry.

Chemical Additives

I would like also to refer to one other area of legislative activity entirely apart from the factory inspection right. It would be surprising if any members of this audience are today unaware of the current concern with the problem of chemical additives in foods. The origins of the problem, its medical, economic, and legal aspects, and the legislative proposals to which it has given birth, have been analyzed, parsed, illuminated, and adumbrated by a Congressional committee, by previous speakers at Association Conventions, and in numerous professional periodicals and scientific journals. I do not need to recount the substance of all this commentary.

What I do wish to impress upon you today is that the problem of controlling the use of chemicals in foods will shortly cease to provide a field for academic discussion and become a matter for active and pragmatic legislative consideration. The Select Committee to Investigate Chemicals in Foods and Cosmetics—popularly known as the Delaney Committee—completed its deliberations last summer. The report of this Committee pertaining to foods vigorously voices the need for supplemental legislation to provide more adequate protection to the public.

Representative Delaney has already introduced a bill in the new Congress patterned on the "New Drug" sections of the Act and requiring prior clearance by the Food and Drug Administration of any new chemical additive not generally recognized by qualified experts as safe for its intended use.

Representative Miller, the sponsor of the original Miller bill of similar effect in early 1951, met this month with representatives of the Food and Drug Administration and the interested industries to obtain their views on the principles to be incorporated in further legislative proposals.

I do not intend to retravel old grounds in discussing this issue. I refer you to the published comments of Mr. Austern at the February, 1951, meeting of the Association and to the papers of the N.C.A. representatives at the Annual Meeting of the Institute

of Food Technologists in June, 1952—all of which have been published in the INFORMATION LETTER [see "Progress in Food Production and the Protection of the Public Health," INFORMATION LETTER No. 1325, Feb. 28, 1951, page 102, and Supplement to INFORMATION LETTER No. 1391, June 14, 1952.] While lawyers may have the task of transposing the various considerations into the language of legislative amendments, the controlling principles which will be incorporated in such legislation are matters for you, as members of the regulated industries, to consider, to crystallize, and to recommend for adoption.

In its most basic terms, the issue which Congress will be asked to resolve may be stated as follows: If any new ingredient is developed for food use, or if in the production or processing of any food product any new substance may be inadvertently or intentionally introduced, how is the danger of possible toxicity to be controlled? More immediately, is the present law inadequate to safeguard the public against the inadvertent or intentional use of possibly toxic ingredients in foods? The Delaney Committee thinks it is. So also does the Food and Drug Administration—as well as a number of segments of the food industry.

If it is assumed that further protection is necessary, how may this protection best be achieved—without placing unnecessary obstacles in the path of technological improvements in food production and processing or restricting industry incentive toward research? No one urges that the public health considerations be assigned a secondary role, but a failure to consider the additional interests of technological progress and administrative justice may well involve burning down the house to eliminate a few rodents.

Does the protection of the public make it necessary to go so far as to require specific prior clearance by governmental authority before a new chemical additive may be introduced into use? Or would the requirement of advance notice of use be sufficient to enable the FDA to determine in advance whether the proposed chemical additive may be safely employed in food products?

Who should have the principal responsibility for obtaining clearance of the proposed chemical additive—the manufacturer of the chemical in question, or the user? What information should be required of any manufacturer or processor seeking clearance or filing the advance notice of proposed use? Should the person filing the information be required to furnish evidence of both the harmlessness and the usefulness of the added substance—or merely the harmlessness?

Should the Food and Drug Administration be given the sole and final say as to the possible toxicity of any new substance? Or should a right of appeal from the Food and Drug Administration's determination be provided? Should it be an independent panel of experts or to the courts? If a right of appeal is provided, should the higher authority be privileged to make its own independent determination on the facts, or should it be required to uphold the administrative decision unless clearly erroneous or without a reasonable foundation in the record?

How long a waiting period must be provided to enable the Administration to adequately evaluate the dangers in the proposed use of the substance—yet not unnecessarily delay the commercial application of useful discoveries? How broad or how narrow should be the category of substances subject to these procedural requirements? Should the definition of chemical additives be so wide as to include substances employed in caulking railroad cars—as might be the case under the recently introduced Delaney bill—or should the requirements of any new legislation be limited to actual ingredients in foods or some other less embracing category?

These and a host of others are questions which the regulated industries must be prepared to answer for the new Congress. As the representative of the canning industry, the N.C.A. awaits your continuing advice. Only with the aid of informed comment, intelligently reasoned and supported wherever possible by reliable data, can a problem of this nature—which so readily adapts itself to alarmist hysteria—be given the objective and realistic appraisal by the Congress that it deserves.

Many additional developments in the area of food and drug regulation—proposed food standards, the fruit fly problem, the use of consumer advisory panels—I leave to Dr. Harvey of the Administration who follows. As those of you who still engage in the American practice of reading the comic strips may today be aware, Dr. Harvey is no longer entitled to consider himself a representative of an unheralded and popularly unknown agency. Dr. Rex Morgan, M.D., nationally syndicated comic strip hero, physician, sleuth, and self-appointed defender of the public health, is now engaged, with the active cooperation of the Food and Drug Administration, in bringing to justice a splendidly proportioned young blonde who was careless enough to have poisoned her husband. To date, the comic strip has provided us with a clear expression of the Administration's views on only two subjects—husband poisoning and herb doctors. Perhaps Dr. Harvey will enlighten us on their views in areas of—I most sincerely trust—more immediate significance to members of the canning industry.

Enforcement Developments

By John L. Harvey,
Associate Commissioner,
Food and Drug Administration

We are all greatly indebted to Mr. Carothers, who just preceded me on this program. His presentation of two important subjects related to current legislative efforts is most admirable. It is clear, succinct and thorough. I owe him my thanks because he has relieved me of much that I might have said, had he not been available, and he has said it well, which I might not have done.

It is my particular assignment in the Food and Drug Administration to be responsible for establishing policies and making final decisions for the Food and Drug Administration on all seizures, prosecutions and injunction proceedings dealing with violations of the Act. Because some of your members have expressed an interest in phases of the matters for which I must be responsible, we in the Administration decided it would be fitting for me to accept the invitation which you so graciously extended. This combination of circumstances places me before you now.

I do not intend to dwell upon or even recite the various legislative proposals which are before the Congress or in the minds of legislators or those who would influence them. I know that you, individually, and through your counselors and committees, will give due consideration to all of them that reach the standing committees of the Congress and at the proper time and place will make your views known and felt. On the legislation to restore the *status quo ante* of the factory inspection section the Federal Security Agency has expressed itself. Our views on other proposed legislation will be expressed when the committee chairmen so request. I might reiterate at this point that our view of the bill to amend the inspection section is one of restoration of the status before the Supreme Court decision and while I must commend the thoroughness of N. C. A. Counsel in exploring all angles, I am happy that any concern about extension through adoption of administrative interpretation has been laid to rest by the Administrator's statement. We seek no more in this proposal than a restoration of that which the original enactment was presumed to have accomplished. Irreconcilable differences as to interpretation of the scope of other questions that may arise in the future are subject to litigation on the peculiar facts

of the case in keeping with the immemorial rights of disputants.

Factory Inspection Vital for Enforcement

Other questions about factory inspections have been suggested to me as worthy of discussion here. It is obvious that inspection of factories at reasonable times is a necessity if the purposes of the Act are to be accomplished for the protection of the consumer. As has been pointed out, some of the sections of the Act are left wholly without a basis for enforcement if observations of factory operations cannot be made. Equitable and evenhanded enforcement can be accomplished only if enforcement officials are possessed of up-to-date, intimate knowledge of an industry-wide basis so that all of the facts that are reasonably relevant to the individual problems can be considered in proper perspective and fair and just decisions made. Such information cannot be obtained generally by a process of random sampling and laboratory examination. Guided selective sampling can stem only from knowledge accumulated through broad and specific information. Sampling following factory inspections can be largely eliminated and regulatory activity confined to areas where it is most needed for the public good. Highly selective regulatory operations based on knowledge acquired at the source of production give the taxpayer the highest possible return in terms of protection. Such a program also affords the maximum of protection to manufacturers against unscrupulous competitors and an opportunity to benefit directly from inspections of their own plants.

In a few instances, management displays noticeable reluctance and even definite hostility when inspectors apply for admission to their establishments to make inspections. It has been quite generally said that such an attitude can arise only where the manufacturer has something to hide and knows or strongly fears that the inspector will uncover some practice that will lead directly to regulatory trouble. While whenever this is true it is a thoroughly understandable reason for reluctance, I am not so certain that I always agree with the majority view. I think that the reluctance and apprehension that management sometimes displays stems from misunderstanding and a lack of appreciation of the advantages, both to the public and to the manufacturer, of an adequate program of factory inspection by the Food and Drug Administration.

I've been asked, "Why don't you tell the people just what is in the mind of the FDA when it sends an inspector to inspect a cannery?" My answer to that has been, "I thought everyone already knew." A factory inspection is not just a fishing expedition, to discover whether there may not be a basis for causing a canner trouble. The work of the Food and Drug Administration is programmed and integrated by a planning division and the efforts of the inspectors are expended in an orderly coverage of industries and not on a hit-or-miss pattern. The object is to learn about and appraise on an individual factory and industry-wide basis all of those things that are going on and that have a bearing upon violations of the Act and constitute an abuse of public trust. We seek to accomplish prevention of violations to the fullest extent possible and correction of violations to the extent necessary. We try to do what can be done and what must be done to assure the public a clean, sound, wholesome and legal food supply.

There is no real difference between our objectives and those of every producer and manufacturer who seeks to run an honest business and deserve the confidence and patronage of the public. The inspector expects to be afforded an opportunity to observe and learn about all of those features of the manufacture of a food that are necessary to a determination that the products which come under his scrutiny are safely within the range of acceptability. Where that kind of conclusion cannot be reached from the facts we have a duty to employ those procedures that can be used within the scope of the Act to bring about a correction for the benefit of the consumer and for the particular manufacturer and those in competition with him. If the correction sometimes seems at the time to be harsher than the manufacturer thinks necessary, it is to be remembered that all actions are subject to trial in the courts and that the safeguards established for the manufacturer's protection are those of our Constitution and the laws of Congress.

Inspector's Duties

In carrying out his duties in learning and reporting facts, it is the inspector's basic instruction that he shall conduct his inspections on a courteous and tactful basis in an atmosphere of friendly helpfulness, to the degree that the attitude of management will permit. He is fully prepared to be accompanied in his rounds by responsible officers of the plant and to point out to them the observations which he makes. He is fully authorized to discuss his conclusions and make such suggestions as he can properly make. He is not expected to force his comment upon an unwilling or disinterested plant superintendent, nor is he required to engage in argument or controversy. He is not present in the role of an expert in plant management nor as a talebearer to discuss what he has observed in one plant with management of another. He does not make any rules or give any orders. He does incorporate his factual observations and the information imparted to him into a report which he submits to his headquarters.

These reports are reviewed by trained men who have the benefit of many reports, and evaluation is made in the light of the over-all picture presented with broad knowledge of the subject matter and of the industry under consideration. Where the facts compel it, further investigation is made, both by repeat factory inspections and by the collection and examination of samples taken from the channels of interstate commerce. Any action to seize, prosecute or enjoin must be passed on in Washington where the facts are studied in a framework of over-all policy. Approved regulatory actions are reviewed from a legal standpoint in conformity with rules and patterns established by the Attorney General and thereafter referred to the appropriate United States Attorney for filing.

I have heard it suggested that inspectors engage on fishing expeditions, undertaken to trap the unwary manufacturer, by concealing from him their observations and thereafter reporting to administrative officers in a highly colored fashion. I know for a fact, that any such stories are far, far from the truth. Inspectors are required to report factually on the attitude of the manufacturer, and put down a summary of comment and suggestions made to the manufacturer and what the manufacturer said and did about it. Many manufacturers have told me that they were tremendously benefited by the discussions that they have had with inspectors and have been able to avoid difficulties that might well have arisen if they had not been forewarned by the comment which was given them.

Let me say, here and now, that I recognize that what I have been saying is well known to most of you. The vast majority of the canners of the United States display splendid cooperation with our factory inspection programs and if they do not always feel a surge of joy at the arrival of an inspector they manage to conceal their feelings very well.

Other Types of Investigation

We, of course, must be constantly engaged in studies and investigations that are not directly a part of factory inspection operations. We must acquire and evaluate a vast store of information about the problems that beset industry and seek remedies for these problems. We must make the necessary studies to maintain a sound continuation of a standard-making program. We must be alert to the best of our ability and resources to all of the changes, both rapid and slow, which are going on in industry. We must try to evaluate all of these things and maintain a policy and program of regulation calculated to keep situations from getting out of hand. In all of this we do enjoy widespread

cooperation from the industries affected. We do have the benefit of a vast amount of research and progressive study that industry devotes to its problems. Much of this factual information which is made available to us is technical and scientific. Much of it comes to us in well prepared reports that we can study and inquire into by cross checking and comparison of results. On some occasions, I have been impressed with difficulties that arise in developing this exchange of facts. Sometimes a basically sound and common sense approach to this sharing of the facts for the common good seems to fall down and our efforts at getting all the facts that can be brought to bear on a given problem take on the color of a sparring match. Each side seems to fear to lower its guard for an instant lest there be a sock in the solar plexus from an opponent. This attitude should never exist. It is not my purpose to deliver a lecture on how to deal with the Food and Drug Administration. It does seem to me, however, that when one has technical and scientific data which have been laboriously and earnestly obtained, and he desires to bring it to the attention of the enforcement officials as of possible influence on the knowledge and judgment which they seek to apply to their tasks, that there are logical ways to do it, and that a fear that it may be used against the giver is misplaced.

I suggest that the practice to be followed is that which prevails among scientific and technical people generally. Why not submit data in a coherent written form of a scientific or technical report for study by scientists who are familiar with the subject matter, and provide opportunity for discussion and elaboration and for verification and collaborative study, where such is indicated? We cannot give much weight to some of the facts or alleged facts about which we are told because we are not given much opportunity to examine them objectively.

We hope that you will always feel free to call our attention to facts that we should consider. We do wish to take into account all that is relevant and pertinent. We are anxious to give such facts all the weight they deserve.

Vinegar Fly Problem

I come now to a topic which I have included by request. It is not of direct interest to all canners but should be of concern to all who have any problem of housefly or vinegar fly infestation. It is of much concern to tomato canners in some localities. Prevalence of vinegar flies affords an opportunity for the drosophila to lay their eggs in cracked and broken areas of tomatoes and unless adequate precautions are taken to prevent this tomato products made from such stock may contain both the eggs and maggots from the fly. Obviously, this problem for basic solution calls for the establishment of practices which will eliminate the fly as a source of contamination. In general, the efforts carried on to develop effective entomological control have not been particularly encouraging. Additional study and extended efforts to develop more successful control will be made.

Much has been said about the appearance of these eggs and maggots in otherwise sound tomatoes. I believe that the inferences that have been drawn in some quarters from these comments about infestation of sound tomatoes are somewhat broader than the facts warrant. It is not my intention to dispute the application of the term "sound" to tomatoes displaying even deep cracks radiating from the stem end center so long as those cracks are not moldly or rotten. It is, however, to be kept in mind that the primary location of egg deposition is in these cracks. In those areas where cracked tomatoes are the exception rather than the rule, even though the incidence of vinegar fly and other flies is not significantly different quantitatively, the incidence of eggs and maggots in the tomato products is tremendously less. It would appear that the circumstances which predispose to heavy contamination with eggs and maggots are simply those where the flies are highly prevalent and the growing conditions promote cracking of tomatoes. The occurrence of rot in tomatoes of course varies in different localities, the different seasons and at different times within the season due to weather and changing conditions. Some of the same features are applicable with respect to the egg and maggot problem and until such time as effective methods of eliminating fly infestation are developed, it may be that the solution of the egg and maggot problem is similar to that which solves the problem of partially rotten tomatoes.

Proposals for Control

There is some debate about the feasibility of eliminating fly eggs from the cracks in tomatoes by a washing process, using significant force of the water. Whether the feasibility of this approach has been adequately explored I cannot say. If it has not, it may offer a solution, although I have been told about the gelatinous character of the eggs. If a washing method is not feasible, then these infested cracks are on much the same basis as the rotten spots. If the infestation can be trimmed out and such a procedure is economically feasible, the result is clean, sound tomato products. I do not for a moment suggest that we should ignore getting rid of the pest, but I do offer the suggestion that there may be more than one way of producing a clean, sound end product even though a full answer to eliminating the fly population has not yet been offered.

Arguments have been made that recognizing vinegar fly infestation as an index of decomposing tomatoes or other fruits is not valid in the light of recent studies on tomato products. While the theory that egg and maggot infestation is nothing more than an index of decomposition, or not even that, may have some appeal as an argument in some circles, I seriously question whether consumers will be particularly intrigued by the more esoteric viewpoints which are thus raised, since the consumption of fly eggs and maggots as a necessary concomitant of eating tomato products is not likely to appeal even if we call the maggots larvae. The courts and juries seem to agree that eggs and maggots in tomatoes is filth. We are very much interested in studying the data of various investigators who have been concerned with the vinegar fly problems. Our attention has been directed to some of the work that has been done but reports in suitable form for our study and consideration have not been made available to us.

The comments with regard to entomological control of this problem prompt me to remind all of us again that pesticides generally are made to kill and are not intended to be eaten. This fact should everlastingly be kept in mind in the production of food.

Consumer Consultant Panel

Considerable interest has been manifested in the appointment of a number of consumer consultants to the Food and Drug Administration and I have been asked to explain what kind of help these consultants give us and also have been asked what kind of people these consultants are.

The 16 consumer consultants who have been designated represent a fairly comprehensive cross-section geographically and from a standpoint of training and experience. They are located in each of our 16 districts throughout the country. Many of them have had specialized training in home economics, most of them are people with college educations and with an interest in public service. It has not been our view that the consumer consultants in and of themselves would serve as a fountain of information of consumer reactions to particular questions and problems, but rather that they could undertake through properly conducted efforts to obtain for us objective information from individuals and groups in their communities. We do not consider their reports as necessarily final. We do find them of benefit to us in applying sound principles. Where conclusive proof is needed, it is necessary to have statistically sound data. The need for information as to consumer recognition, consumer understanding, consumer acceptance of products and their labeling is obvious. The purpose of the enforcement of the Food, Drug, and Cosmetic Act is to protect the American consumer. The understand-

ing of the American consumer must in some way and in some degree be measured in order to accomplish such protection. The consumer consultants are helpful to us in obtaining information along these lines.

Status of Food Standards

You are, no doubt, interested in the present status of food standards which are in any way of concern to canners.

Canned pineapple and pineapple juice: Findings of fact and tentative order are in course of preparation. These include standards of identity, standards of quality and standards of fill of container.

Canned tuna: Standards of identity and for fill of container. This hearing is being delayed beyond schedule to afford industry opportunity to do additional study which is now in progress. I expect that the hearing will be heard before the end of this year.

Canned mushrooms: Standard of fill of container and amendment to standard of identity became effective December 10, 1952. No likelihood of any appeal.

Canned fruits, particularly canned peaches, are under exploratory study from a standpoint of fill of container as effected by change in filling practices.

Canned salmon: Standard of identity and fill of container: Field work on this one is still in progress. I make no guess as to when it may be ready for hearing.

Spray residue tolerances: Draft of tentative order has been considered by Food and Drug Administration, Department of Agriculture, and Public Health Service. Should be in hands of Administrator shortly.

Among the products that may be scheduled for early consideration looking toward a standard of identity is canned sardines. In spite of the fact that sardines in cans have been a widely produced and distributed article of commerce in many parts of the world for a great many years, the question of just what the consumer considers a sardine is still very much disputed. Is it a variety of fish, or a group or family? Is it a style of pack or several styles? Does it include large mature fish or are sardines small immature fish? What are the permissible packing media? These and other questions still exist. Is it better to settle as many of these questions as possible in the courts or should all the questions be resolved by hearing evidence? The interests of importers and the various areas where sardine-like fish are packed or have been packed in the United States and the many different styles and kind of fish involved create quite a problem of reconciliation before any generally acceptable identity standard can be evolved. It seems to be beyond argument that the consumer has a right to be a thoroughly bewildered citizen. One might say, "He pays his money and takes his chances." It is to be hoped for the welfare of packers as well as the public that this unsatisfactory situation will be adjusted by early hearings.

In connection with recent discussions about sardines it has repeatedly been said that the Food and Drug Inspectors have made rulings which are adverse to the public interest as well as the interest of canners. I'd like to emphasize that the Food and Drug Administration does not make rulings. We can express opinions and do so when requested in order to be helpful, but rulings or regulations can be made only by the Administrator of the Federal Security Agency and all such are based on public hearings and are subject to all the safeguards, including appeals to the courts. The regulatory actions brought under the Food, Drug, and Cosmetic Act are all subject to trial in the courts. We do not constitute prosecutor, judge and jury but act in the role of complaining witnesses.

Time does not permit me to discuss many other questions and points that have been suggested to me nor those that I can think of myself. I want to thank the Association and its officers for this opportunity. May I again assure you of our earnest desire to administer the Act sanely, fairly, and in good conscience, always in the direction of the greatest honesty and fair dealing in the interest of consumers, which I am entirely sure is always in the best interest of canners, too.

FIELD MANAGEMENT PROBLEMS

How the USDA Estimates Production of Vegetables for Commercial Processing

By Irvin Holmes, Head
Vegetable Statistics Section,
Bureau of Agricultural Economics

I appreciate this opportunity to participate in your panel discussion of the problems of predicting crop yields. We in the Agricultural Estimates Branch of B.A.E. live with this problem 365 days in the year. Personally, I find it very interesting, although after 25 years I have concluded that it should be classed among the "hazardous occupations."

Dr. Mahoney tells me that there is a steadily growing interest among members of your organization in improved methods of predicting their own crop production in order to have more accurate information upon which to plan their operations. I am glad to hear this. We depend, in a very large measure, upon your individual reports for our estimates. In the final analysis the Department's estimates can be no more accurate than the reports you furnish us. Anything that can be done to improve the accuracy of the individual reports will be reflected in greater accuracy in the state and national estimates. This will benefit all users of these figures.

The Program of Reports

The Department's estimates of these crops were started back in the early days of World War I when the need arose for more information on prospective food supplies. For 1918 we have reports on 7 crops: asparagus, snap beans, cabbage for kraut, sweet corn, cucumbers for pickles, green peas, and tomatoes. Spinach was added in 1919, pimientos in 1926, and lima beans and beets in 1929. At the present time, therefore, the program covers 11 crops.

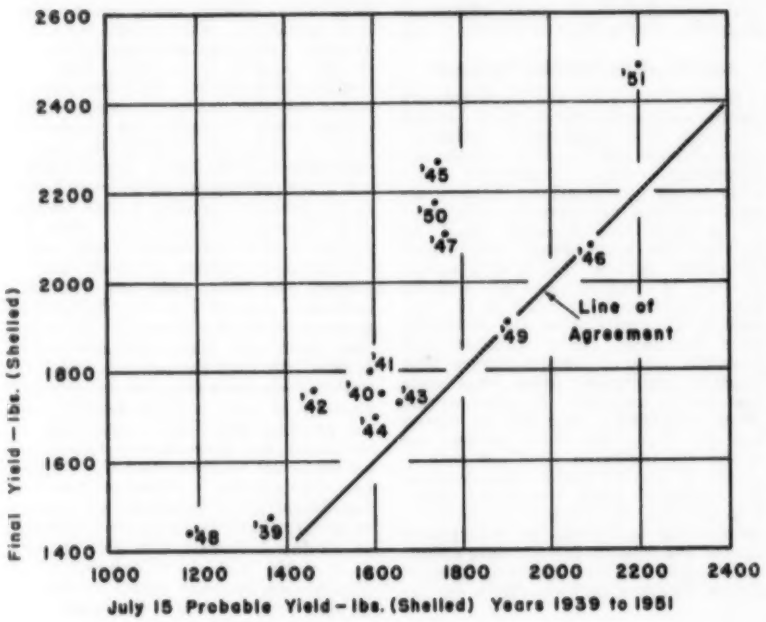
For all of these crops we issue reports on intended or prospective acreage shortly before general planting begins. The release dates for these intentions reports range from January for winter spinach to May for green lima beans and pimientos. Since the processing estimates are not broken down by seasons of the year, the release dates for all reports on these crops are necessarily compromises. The dates used are those which best fit the country as a whole. For a few states they may be early; for some others they may be late.

The intentions estimates are based on reports from processors as to the acreage they expect to grow or contract during the coming season. In preparing these estimates we use charts or graphs for each state, which show the relationship between past reports of intended acreage and acreage finally planted. Our estimates are based upon an analysis of these past relationships. The Department's reports on prospective or intended acreage are, therefore, indications of the acreage that would be planted should the reported intentions be carried out to about the same extent that they have in the past. Their purpose is to provide both you and the growers with an early indication of the acreage that may be planted so that changes in plans can be made before planting, if necessary. The report itself, as well as subsequent weather

FIGURE 1

Green Peas for Commercial Processing in Wisconsin

Comparison of Processors' Estimated Probable Yield July 15 and Final Yield per Acre



and other factors, all play a part in determining how far the acreage finally planted departs from the intentions reported earlier.

From May to July we issue preliminary estimates of the planted acreage for each of the 11 crops. These estimates are based upon planted acreage reports from the processors concerned. On the basis of past relationships between planted and harvested acreage, an estimate is then made for each state of the probable acreage for harvest. These preliminary estimates of acreage for harvest assume that abandonment of planted acreage will be about the same as the average for past years.

During the growing season, preliminary estimates (usually called "forecasts") are made of the prospective production. These preliminary production estimates are prepared by states from the estimated acreage for harvest multiplied by the indicated yield per acre. The state estimates of prospective or indicated yield per acre are based largely upon two indications reported by processors handling the crop—the reported condition of the crop and the reported probable yield per acre. Similar reports from growers are also considered where available. Charts or graphs are used for each state which show the past relationship between condition and yield per harvested acre and the relation between reported probable yield and yield per harvested acre. The published indicated yields are based upon interpretations or reading from these graphs.

I have prepared a copy of one of the graphs we use. This shows, for green peas in Wisconsin, the relationship between the weighted average of the probable yields reported by processors about July 15 and the final yield per harvested acre. There are two interesting things about this graph. The first is that although the probable yield reports were collected at about the peak of the harvest season in Wisconsin, there is considerable variation between these and the final yields. The second is that in only one year (1946) has the final yield been below the July 15 probable yield. This is also true for all the earlier years (not shown on the graph) back to 1932 when we started collecting probable yield reports. The final yields shown are on a harvested-acre basis. If the processors reporting probable yields are thinking of yield per acre planted, this will explain part, but not all, of the underestimation. In preparing the estimates, we use similar graphs for interpreting the various reported figures on intended acreage, planted acreage, abandonment of acreage and crop condition.

For most of the 11 crops, either two or three preliminary estimates or forecasts are made during the growing season, starting in mid-June and ending in October. For all crops except green peas, these preliminary estimates during the growing season relate to conditions reported as of the first of the month. For green peas, such estimates are made at 15-day intervals, as of June 15, July 1, and July 15.

At the end of the harvesting period inquiries are sent out covering contract acreage planted, contract acreage harvested, production from contract acreage, open-market purchases, and average prices paid for both contract and open-market tonnage. The contract operations also include acreage grown by the processor on his own land or leased land. These inquiries are used as a basis for the preliminary estimates published in the December Annual Summary Report. For green limas, green peas, and pimientos, preliminary tabulations of these end-of-season reports are also used as a basis for preliminary estimates issued in October and November, preceding the December Annual Summary Report.

For three crops—asparagus, cabbage for kraut, and cucumbers for pickles—the program of reports differs somewhat from the general pattern just outlined. You will find these differences explained in the published program of reports.

In preparing the estimates from the end-of-season reports, separate calculations are made—but not published—for contract and open-market operations. On the basis of the reports an estimate is first made of the acreage and production for the crop grown under contract. Next an estimate is made of the quantity purchased on the open market. After considering both processors' and growers' reports on yield per acre (where growers' data are available), an estimate is made of the "equivalent" acreage necessary to provide the open-market tonnage. The contract and open-market segments are then combined to arrive at the total estimate for each state.

A similar procedure is followed in estimating the average price for each state. That is, separate prices are established—although not published—for contract and open-market and these are weighted by the contract and open-market tonnages in arriving at the state-average price.

In all of these reports we take into account the differences in size of operation between firms. The estimates of yield per acre are derived from reported acreage and production so the yields are weighted by the acreage reported by each firm. The

reports of prices are weighted by the tonnage handled by each firm.

Follow-up inquiries are sent to processors who have not returned end-of-season reports. This is continued during the winter and spring months, and such late reports are added to our tabulations as a basis for revising the previous year's estimates, where necessary. We prefer to make, and do make, revisions in advance of the next crop season in order that the new estimates will be projected from the best possible base. However, revisions are also made in December of the following year after which time the estimates are ordinarily allowed to stand. Thus, the 1951 estimates, published in the December 1952 Annual Summary, will probably not be changed until long-term revisions are made following the next federal Census. Since these estimates are based upon a fairly complete coverage of the processors, there are relatively few such long-term revisions.

Another source of information which is considered in revising the Department's estimates are the published reports on the canned pack, issued by your own Association, and the corresponding regional and national figures on the frozen pack, issued by the National Association of Frozen Food Packers. Of course, these reports on the manufactured products relate to the state or area where processed, whereas our reports on the raw product are for the state where grown. Nevertheless, these published pack reports have been very helpful and I want to express our appreciation to your organization for making them available to us.

Accuracy of the Preliminary Estimates

How accurate are the Department's preliminary estimates on these crops? Although the production estimates made during the growing season are sometimes called "forecasts," this term needs qualification. I have already pointed out that the estimates of acreage for harvest, used in making the preliminary production estimates, assume that abandonment or loss of planted acreage will be about average. Furthermore, the method of arriving at the indicated yield per acre, from condition and probable yield reports, assumes that weather conditions after that date will also be average. In other words, if weather conditions after the report are more favorable than average, we expect the indicated yield per acre to go up; if less favorable than average the indicated yield should go down. You can see, therefore, that the indicated yield is simply an interpretation of the reports for the date given; no attempt has been made to forecast future weather and its effect on the crop.

We have made some comparisons of the preliminary and final production estimates for the United States estimates which I believe you will find interesting. These cover three important crops—sweet corn, green peas, and tomatoes. For sweet corn, the 10-year (1942-51) average departure of the August 1 estimate from the final is 6.8 percent. This average ignores the plus and minus signs of the comparisons for individual years. In 6 of the 10 years, 1942-51, the August estimate was too high. For September 1, the corresponding average figure is 5.8 percent, October 1, 4.0 percent and December 2.6 percent. The departures for individual years show considerable range, as would be expected. In 1943, 1944 and 1947 the estimates started high but declined as a result of hot dry weather. However, they were too high throughout the season. In 1949 the reverse was true.

For green peas the June 15 estimate shows a 10-year average departure of 5.9 percent, the July 1 and July 15 estimates 6.2 percent, the October 1 estimate 2.0 percent, and the December 1.4 percent. From a national standpoint these figures do not appear to justify three early-season estimates at 15-day intervals, but this is only part of the picture. Changes in the distribution between states of the indicated production are important and

FIGURE II

1953 Program of Reports—Release Dates Vegetables for Commercial Processing

Crop	Prospective acreage (Intentions)	Planted acreage	Growing conditions and crop progress	Acreage for harvest and			Harvested acreage and preliminary production	Annual Summary
				1st production indication	2nd production indication	3rd production indication		
Asparagus [1]								Dec. 17
Beans, Green Lima	May 11	July 10	June 10 July 10 Aug. 11	Sept. 10	Oct. 9		Nov. 10	Dec. 17
Beans, snap	Apr. 10	June 23	May 22 June 10	July 10	Aug. 11	Sept. 10		Dec. 17
Beets	Apr. 23	July 10	June 10 July 10 Aug. 11	Sept. 10	Oct. 9			Dec. 17
Cabbage for Sauerkraut [2]	Apr. 10	July 10	June 10 July 10	Aug. 11	Sept. 10	Oct. 9		Dec. 17
Corn, sweet	Apr. 10	June 23	May 22 June 10 July 10	Aug. 11	Sept. 10	Oct. 9		Dec. 17
Cucumbers [3]	Apr. 23	June 23	July 10 Aug. 11				Nov. 10	Dec. 17
Peas, green	Mar. 10	May 22	May 11 May 22 June 10	June 23	July 10	July 22	Oct. 9	Dec. 17
Pimientos	May 22	July 10	July 10 Aug. 11	Sept. 10	Oct. 9		Nov. 10	Dec. 17
Spinach								
Winter	Jan. 9	Mar. 10		Mar. 10				Dec. 17
Spring		June 10		June 10				Dec. 17
Fall		Nov. 10		Nov. 10				Dec. 17
Tomatoes	Apr. 23	July 10	June 10 July 10	Aug. 11	Sept. 10	Oct. 9		Dec. 17

[1] Prospective acreage, preliminary acreage, and production indications published in the fresh market reports, relate to total commercial crop for fresh market and processing. The annual summary gives separate estimates of the crop for fresh market and the crop for commercial processing.

[2] See footnote 1. For cabbage for sauerkraut prospective acreage, planted acreage, and production indications relate only to contract acreage (including processors' own plantings); Annual Summary relates to total crop for sauerkraut covering both contract acreage and equivalent acreage for tonnage purchased on the open market.

[3] November 10 report includes report on commercial processors' October 1 holdings of salt and dill pickles in tanks and barrels.

FIGURE III

Sweet Corn, Commercial Crop for Processing

Comparison of preliminary and final estimates of production for the United States, 1942-52

Year	August 1		September 1		October 1		December		Final
	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons
1942	1,276	−0.5	1,330	+3.7	[1] 1,332	+3.9	1,244	−3.0	1,282
1943	1,288	+10.0	1,273	+8.7	1,202	+2.6	1,135	−3.1	1,171
1944	1,221	+17.0	1,097	+5.1	1,080	+3.4	1,000	−4.2	1,044
1945	1,236	+9.2	1,303	+15.1	1,282	+13.3	1,127	−0.4	1,132
1946	1,271	+2.3	1,248	+0.5	1,253	+0.9	1,223	−1.5	1,242
1947	1,210	+10.8	1,138	+4.2	1,130	+3.5	1,043	−4.5	1,092
1948	1,247	−1.2	1,213	−3.9	1,267	+0.4	1,326	+5.1	1,262
1949	1,222	−13.1	1,239	−11.9	1,259	−10.5	1,398	+0.6	1,406
1950	969	−0.5	948	−2.7	987	+1.3	951	−2.4	974
1951	1,239	+3.4	1,223	+2.1	1,197	−0.1	1,217	+1.6	1,198
1952 [2]	1,358	−10.1	1,400	−7.3	1,465	−3.0	1,510	.....	.....
1942-51 Ave.	.....	6.8	.....	5.8	.....	4.0	.....	2.6	.....

[1] September 15 estimate. [2] Preliminary estimates compared with December.

FIGURE IV

Green Peas, Commercial Crop for Processing

Comparison of preliminary and final estimates of production for the United States, 1942-52

Year	June 15		July 1		July 15		October 1		December		Final
	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons
1942	406	−4.2	463	+9.2	464	+9.4	[1] 428	+0.9	427	+0.7	424
1943	422	+2.4	454	+10.2	459	+11.4	405	−1.7	403	−2.2	412
1944	416	+7.5	406	+4.9	403	+4.1	366	−5.4	372	−3.9	387
1945	444	−10.7	463	−6.8	463	−6.8	484	−2.6	490	−1.4	497
1946	469	−10.2	493	−5.6	531	+1.7	523	+0.2	516	−1.1	522
1947	407	−6.4	403	−7.4	401	−7.8	430	−1.1	437	+0.5	435
1948	383	+9.7	385	+10.3	381	+9.2	359	+2.9	347	−0.6	349
1949	342	−1.4	342	−1.4	338	−2.6	361	+4.0	357	+2.9	347
1950	414	−4.4	410	−5.3	404	−6.7	427	−1.4	433	0.0	433
1951	499	−2.5	506	−1.2	524	+2.3	513	+0.2	509	−0.6	512
1952 [2]	481	+12.9	473	+11.0	445	+4.5	433	+1.6	426	.....	...
1942-51 Ave.	...	5.9	...	6.2	...	6.2	...	2.0	...	1.4	...

[1] Issued in September prior to 1948. [2] Preliminary estimates compared with December.

FIGURE V

Tomatoes, Commercial Crop for Processing

Comparison of preliminary and final estimates of production for the United States, 1942-52

Year	August 1		September 1		October 1		December		Final
	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons
1942	3,346	+5.7	3,164	−0.1	3,042	−3.9	3,153	−0.4	3,167
1943	3,102	+16.6	2,873	+8.0	2,775	+4.3	2,646	−0.6	2,661
1944	3,209	+1.2	3,174	+0.1	3,172	+0.1	3,168	−0.1	3,170
1945	3,066	+14.0	2,850	+6.0	2,857	+6.2	2,665	−0.9	2,689
1946	3,195	−5.9	3,011	−11.3	3,094	−8.8	3,529	+4.0	3,394
1947	3,228	−0.5	3,328	+2.6	3,410	+5.1	3,212	−1.0	3,243
1948	2,699	−7.4	2,538	−12.9	2,523	−13.4	2,848	−2.3	2,914
1949	2,436	−3.3	2,374	−5.8	2,362	−6.2	2,634	+4.6	2,519
1950	2,609	−4.6	2,634	−3.7	2,658	−2.8	2,763	+1.1	2,734
1951	3,676	−13.9	3,686	−13.6	3,884	−9.0	4,585	+7.5	4,267
1952 [1]	3,239	−6.2	3,063	−11.3	3,253	−5.8	3,452	.....	.....
1942-51 Ave.	.....	7.3	.....	6.4	.....	6.0	.....	2.2	.....

[1] Preliminary estimates compared with December.

these are not reflected in the above comparisons.

For tomatoes the 10-year average comparisons are: August 1, 7.3 percent; September 1, 6.4 percent; October 1, 6.0 percent; and December 2.2 percent. In the dry year of 1943 the estimates started high and declined, although they remained on too high a level during the growing season, the same as for sweet corn. In 1946 and 1948 blight was prevalent in the East, and it is noteworthy that both crops were consistently underestimated during the growing season. The year 1951 illustrates nicely the hazards of crop prediction. The October 1 estimate for California, which had one-third of the nation's acreage, took into account deliveries to October 1, generally a reliable indication. However, unusually favorable weather after that date featured by above normal temperatures and a general absence of rain, coupled with a strong demand and a very clean harvest of the fields combined to make the October 1 estimate too low.

One additional word about these comparisons: Since they are based on production they take into account changes in both acreage and yield. The August 1, September 1, and October 1 estimates for sweet corn and tomatoes and the June 15, July 1, and July 15 estimates for green peas are all based on the estimated acreage for harvest. The December reports for sweet corn and tomatoes and the October and December reports for green peas are based on preliminary tabulations of harvested acreage and hence are much closer to the final estimates. Securing an accurate early-season indication of acreage that will be harvested is equally as important as making an accurate estimate of yield per harvested acre. For example, in 1943 the early-season estimates of yield per acre for green peas were below the final yield estimate, but the production estimates were too high. In that year more than the usual proportion of the planted acreage in the Pacific Northwest was diverted for harvest as dry peas. Studies have been made of the relation between condition of the crop and the abandonment of planted acreage. The results have not been promising. Apparently, part of the difference between planted and harvested acreage represents what we call "shrinkage in contracts" and not actual loss of planted acreage from natural causes.

Some General Problems

I would like to mention, briefly, some of the problems we encounter in preparing the estimates for these crops. Perhaps these remarks will suggest to you ways whereby the reporting may be improved with a corresponding improvement in the State and national estimates.

First of all, the number of firms processing these crops—about 2,000—is relatively small compared with many of the populations we sample in preparing agricultural estimates, as, for example, the more than 1.5 million farms growing potatoes. This both simplifies and complicates the job. If a high percentage of the firms report we can make a satisfactory estimate. But if even one large firm fails to report it may cause considerable error, particularly in the estimates for the states in which that firm operates.

We are sometimes asked, "What percentage of the firms report?" It is difficult to give a generalized answer to this question. When the final estimates are prepared we will have end-of-season reports on harvested acreage and production for most firms; for a few we may have only their preliminary report on planted acreage; for an even smaller number we will have only an intended acreage report. Last fall when we were checking the estimates of cucumbers for pickles in four Midwestern states we found that

our sample covered 77 percent of the estimated production. Adding the firms for which we had, at that time, only early-season reports of acreage, showed that our sample covered 86 percent of the estimated acreage in these four states. A few weeks ago I was checking the 1952 estimate of tomatoes for processing in New York State. The reports received up to that time covered 88 percent of the estimated production. Of course, in some states the coverage is not this good. This is particularly true for states in which the bulk of the operations are handled by a large number of comparatively small firms. In general, the coverage is good, but it should be better, particularly if we wish to reduce the errors in the estimates for individual states.

Another problem is the need for more refinement in the condition and probable yield figures reported to us during the growing season. At the present time we ask each firm to report separately for the different counties in which they operate. For the major crops these reports are then tabulated by districts within states and weighted by districts to arrive at state averages. Some firms give a good county breakdown of their condition and probable yield figures. However, we notice that other firms report a constant figure for all counties concerned. If it is impractical for most firms to break their condition figures down by areas within a state, we have two alternatives. We can ask for condition and probable yield either by plants or for all plants the firm operates in a given state. Such figures would be weighted by plants or firms to arrive at the state average. Such a procedure would simplify our operations. But it would assume that each firm had given the proper weight between areas or plants in arriving at the average they report to us.

Closely related to this is the problem of obtaining accurate probable yield reports where there is a sharp upward trend in the level of yields. Tomatoes afford a good example. It has been difficult to predict such trends because numerous factors are involved —hybrids, improved varieties, better cultural practices, improved methods of insect and disease control, and so on. Theoretically, the probable yields reported to us should come nearer to keeping up with a trend in yields than the condition reports. Unfortunately this is not always the case. Conservatism appears to be a common trait in all of us.

Finally, there is the ever-growing demand for more detail in our estimates. For many years we have issued supplementary reports which show by types the planted acreage of snap beans, sweet corn, and green peas. In addition, the intended acreage, planted acreage, and end-of-season reports for green peas are broken down on a national basis between canning and freezing. We have collected similar information on the canning-freezing breakdown for green limas, snap beans, and sweet corn. This information has been used in checking our estimates against the canned and frozen pack figures, but limitation of funds and personnel have prevented us from preparing and publishing a breakdown of the national estimates, as we now do for green peas. This is a job that we propose to undertake whenever we get the necessary facilities.

Objective Measurements

Time does not permit discussion of research done in agricultural estimates on improving yield estimates by means of objective counts, weather-crop yield correlations and so forth. But I would like to make one general observation: In predicting crop yields on your own operations you have two advantages over us who deal with estimates on a state and national basis. First, you are in close contact with the crop throughout the season. Second, you are dealing with areas which can be broken down into relatively homogeneous units. Under these conditions it seems to me that properly-designed samples of objective counts, and weather-crop yield studies, should be of assistance in obtaining more accurate estimates of your own crop production.

Minor Elements for Maximum Economical Yields

By K. C. Berger,
Department of Soils,
University of Wisconsin

The minor elements needed for plant growth are copper, boron, manganese, zinc, iron and molybdenum. The minor elements exist in soils in two forms—available forms which plants can use and the fixed or unavailable forms, which plants cannot use. Elements in soils range from only a few pounds per acre plow layer for some, up to several percent for others. Usually only a small fraction of these are in the available form, while a large bulk are found in minerals which make up the solid portion of the soil. These minerals decompose slowly and release the minor elements for plant use in an available form.

This release helps to take care of part of the plant needs. However, when crops are removed from the soil, there is a natural loss of these minor elements. Eventually in some soils there is an insufficient amount of them in available form for plant growth. On the other hand, some of the minor elements are present in most soils in sufficient amount so that they probably never will become deficient for plant growth. Iron is an example of the latter group and boron is an example of the first group that might become deficient in soils.

Another important factor in considering availability of minor elements is the plants' needs for them. Crop plants are not alike in their needs for minor elements and, as a matter of fact, vary quite widely in their requirements. One crop might need a lot of boron, for example, and only a small amount of other minor elements.

Furthermore, some soils are low in one of the minor elements and high in the rest of them. This means that usually it is necessary to apply only one minor element at a time for a particular crop. It is rarely necessary to apply all the minor elements at the same time to a soil. For greatest efficiency of production, however, it is just as essential to apply the amount of minor elements needed as it is to have spark plugs in your car. Without the small amount of minor elements, your crop will not give the maximum economical yield; just as when one spark plug is missing, the car will not run efficiently.

Iron. This is one of the most abundant of the minor elements in soils, but most of it exists in a form unavailable to plants. The action of soil acids and organic matter readily changes iron to a reduced or available form. There are only a very few alkaline soils that are deficient in iron and these occur largely in the arid regions of the West.

Iron is directly connected with the functioning of the green coloring matter in plants and a lack of it causes the top leaves to become a pale creamy white color while the lower leaves remain pale green.

Copper. While amounts of copper are small in soils, the amounts needed by plants are also very small. However, deficient areas do exist and crops have responded to copper fertilization in Florida, Michigan, New York, Delaware, and Wisconsin. Muck soils have shown copper deficiency, and in Wisconsin in 1952 yields of oats were increased from one bushel per acre to 70 bushels with the application of 20 pounds of copper oxide.

Sweet corn yields have been improved in Wisconsin with the application of 5 pounds of copper sulphate per acre in the hill on light-colored upland soils. These increases have been as much as 40 percent. Recent experiments have also shown field corn yields to have been improved.

Zinc. Soils likely to be deficient in zinc are light-colored sandy soils and some alkaline soils and muck soils. Zinc deficiency in soils has been found in Florida, California, and Wisconsin. Yields of sweet corn were increased on light-colored acid soils by the ap-

plication of 10 pounds per acre of zinc sulphate in the hill.

Deficiency symptoms on corn are a pale yellowing of the new upper leaves with white strips between the veins. Zinc deficiency is not widespread but there are areas which need it at present.

Manganese. There are considerable quantities of manganese in many soils and the amount present in available form depends on soil acidity to a large extent. Manganese becomes available in acid soils and when the soils are below pH 5.0, manganese actually might become toxic to some crops. Yields of potatoes have been considerably reduced by excess manganese even though none had been applied. Liming corrects this condition.

Usually manganese becomes deficient only on high lime soils, particularly when they are low in organic matter. Small grains, tomatoes, tobacco, and corn are crops that require relatively high amounts of manganese.

Molybdenum. Molybdenum deficiencies sometimes occur on acid soils. Yields of peas, as well as those of alfalfa and some other legumes, have been increased by applications of molybdenum. Amounts of molybdenum necessary for crop growth are extremely small, something on the order of $\frac{1}{100}$ to $\frac{1}{1000}$ of a pound per acre. Molybdenum deficiency occurs sometimes on acid soils, but when the soil is limed, the availability is increased.

Boron. This element is probably needed on more soils in the humid region of the country than any other minor element. Often light-colored acid soils, droughty soils, sandy soils, and alkaline soils are those that first show boron deficiency.

Crops with a high boron requirement are table and sugar beets, turnips, alfalfa, carrots, celery, cabbage, and cauliflower.

Crops with a low boron requirement are grasses, small grains, peas, beans, and corn. Boron deficiency can be cured by an application of from 10 to 60 pounds of borax per acre.

In Wisconsin boron is recommended for all canning beets and sugar beets and on about one million acres of alfalfa.

Greatest efficiency of production can be achieved only when needed minor elements are added. Knowledge when and how to add them is important because excess often causes toxicity. Although amounts needed are small, yield increases that can be obtained are large and great efficiency in production is obtained through these application when they are needed.

The Role of Fertilizer in Obtaining Maximum Economical Vegetable Yields

By M. H. McVickar
National Fertilizer Association

I'm sure the panel is in full agreement that present vegetable yields are not as high as they should be for most economical production. We've made great strides during the past decade, but far greater advances must still be made.

Crops are like animals. To produce well they must be fed well. This is the particular theme I wish to discuss. Today vegetables are the number two user of fertilizers. More than 10 percent, or some 2,100,000 actual tons of commercial fertilizer are applied annually to these crops. This is more fertilizer than that now going on the cotton crop and about 40 percent of the amount used on corn.

In 1927, only 363,000 tons of fertilizer were used on all vegetable crops. This was equal to 5.3 percent of the total fertilizer consumption. Eleven years later, in 1938, even less fertilizer, only 325,000 tons, was used on vegetables. As already mentioned, approximately 2,000,000 tons are now used on vegetables although the acreage is little more than it was in 1938.

A little arithmetic develops the fact that the average acre fertilization in 1927 was approximately 371 pounds. Remember: This is pounds of *fertilizer* and not pounds of *plant food.* Because of two factors, an increase in acreage and a drop in total fertilizer used on vegetables, only 207 pounds was applied per acre in 1938. The average fertilization in 1950 is much higher—1,130 pounds per acre. This 1,130-pound-per-acre rate is just 10 times the average rate of corn fertilization in the United States.

Of course, the question which immediately arises is this: Did usage of fertilizer reflect itself in higher yields? Here are the average yields in tons per acre. In 1927, 3.74 tons per acre; in 1938, 3.26 tons per acre; and in 1950, 4.18 tons per acre. Fertilizer usage and acre yield of vegetables have gone up together. There exists conclusive evidence of a good positive correlation between per acre yield and rate of fertilization. Such factors as better varieties and better insect and disease control have also contributed to the increase, but I dare say fertilizers have also played an important role in this increase.

How much fertilizer could the vegetable grower use and still increase his yield? The answer, of course, depends on many factors such as natural soil fertility, physical condition, etc. A reasonable estimate of the amount that would be used on the average to give maximum yields would be just one ton per acre, considering present varieties, planting and cultural methods. The projected average yield at this rate of fertilization would be approximately 5.25 tons per acre—up more than 25 percent over present yields. Increasing yields can be obtained by using more plant food even if present cultural practices are not improved. The additional yield that could be expected from using more fertilizer would take a little more time to harvest but that is about all. The time required to prepare the land, seed and cultivate the crop would be about the same regardless of yield. In most instances, the farmers would find that the additional units of yield associated with better use of fertilizer would be most profitable. It's the same the world over; the higher the yield, the lower the unit cost of production and the greater the spread between production costs and selling price. I want to make it clear that I'm talking about yield and yield alone. Quality is equally as important as quantity but usually yield and quality go up together. In fact, quality can usually be improved after maximum yield is obtained. Many good vegetable growers are using more than a ton of fertilizer per acre because they find that it pays.

I am confident of this one fact: Many vegetable growers are not getting the most from the fertilizer they use. In many instances they aren't using the right ratio of plant foods. Others aren't planting so as to take full advantage of the added nutrients and many are failing to place the fertilizer where it should be for best results. In many instances the placement is wrong because there is no suitable equipment on the market. When this hurdle is overcome, I'm sure vegetable yields will shoot upward almost overnight. We're going to make this forward step. The moderator of this panel, Dr. Jackson Hester, heads the Vegetable Subcommittee of The National Joint Committee on Fertilizer Application. Dr. Hester and his committee members are going to draw up and present at the Annual Meeting of the Committee in 1954 specifications for a fertilizer distributor that will place the fertilizer properly for vegetable crops.

Another thing I'm sure that we all agree on is this: Each succeeding year will bring new advances in our technology, new and better varieties, and other improvements that will lead to increased per acre production. Most of our plant breeders are now putting emphasis on developing strains that will take full advantage of high fertility.

Anyone considering all of these factors must come to this conclusion as to the prospects: In the future we'll see much larger vegetable yields more efficiently produced than farmers are harvesting today.

RAW PRODUCTS PROCUREMENT AND MANAGEMENT

How Do Canning Crop Prices Compare with Prices of Competing Crops?

By Howard L. Stier, Director, Division of Statistics, National Canners Association

There are several ways of making comparisons between prices of different types of commodities. For example, a comparison may be made between the absolute prices for a unit quantity of the commodities, or comparisons may be made between the relative purchasing power of the unit quantity of each commodity. When the unit of measure or absolute prices are quite different, it is usually preferable to use an index of some kind. In this study of price comparisons the annual average prices per ton for the canning crops and per unit volume of the competing crops were tabulated; and then the prices of both were converted to a percent of the respective parity prices for each year. These price-parity relationships were then charted for the period 1930 through 1952 so that an accurate picture could be quickly obtained of the relative changes that occurred in the price of each commodity in comparison with its parity price. Whether one will accept the parity concept in its entirety or not, it nevertheless serves as a useful method of comparing prices of different crops because price is reduced to a common base, i.e., a percent of parity price.

The use of the parity price in comparison with the actual season average price seems particularly appropriate here because of the very frequent reference by producers and others to the parity price as a standard of comparison.

The comparison of prices (as a percent of parity) of the major vegetables grown for processing with the prices of the competing field crops reveals that the prices for the vegetables for processing have been above their parity prices more often during the past 23 years than have the prices of most of the competing crops. In addition, I have also made the comparison of processing vegetable prices with the prices of fluid milk and beef cattle, both of which in certain areas compete directly or indirectly with the production of canning crops. The year by year record of these price relationships are shown on Figures I, II, III, and IV.

Of all the vegetable crops for processing, peas present by far the best relative price picture. From 1930 through 1952 (23 years) the season average price paid farmers for peas was above the parity price every year except three. Those three years were the last three—1950, 1951, 1952. The record of prices paid farmers for the four major vegetable crops for processing compared with four competing field crops and milk and beef cattle during the 23 years, 1930-52, is shown in the following table:

	1930-1952	
Commodity	No. of years prices were above parity	No. of years prices were less than 90 percent of parity
Peas	20	0
Sweet corn	11	7
Snap beans	8	9
Oats	8	10
Soybeans	8	11
Milk	7	11
Tomatoes	7	11
Field corn	6	13
Beef cattle	6	14
Wheat	2	19

As interesting and useful as this 23-year record may be, it does not effectively bring into focus the price relationships that are of more current importance this year and those of the past five years. Here is the record for the period 1948 through 1952:

Commodity	No. of years prices were above parity	No. of years prices were less than 90 percent of parity	1948-52 Average (*percent of parity*)
Beef cattle	5	0	117.8
Asparagus	2	1	102.7
Lima beans	2	0	101.6
Milk	2	0	99.2
Snap beans	2	0	98.6
Sweet corn	2	1	98.3
Beets (canning)	1	1	96.7
Peas	2	0	95.6
Soybeans	0	2	93.8
Tomatoes	0	2	91.9
Oats	0	2	91.5
Spinach	0	4	86.8
Field corn	0	3	86.4
Wheat	0	5	86.0

On the basis of price comparisons alone, beef cattle and dairying appear to have been most competitive with canning crops during the past five years, with soybeans also in the running. When relative prices are compared for the year 1952 alone, essentially the same situation is shown. The 1952 comparison is shown in the following table:

Commodity	1952 prices received by producers as a percent of parity
Beef cattle	116.2
Fluid milk	102.1
Sweet corn	100.5
Asparagus	99.0
Soybeans	98.9
Apples for processing	97.6
Snap beans	97.3
Oats	92.8
Cling peaches for processing	92.4
Tomatoes	91.8
Peas	91.1
Field corn	89.1
Wheat	83.8

Other Elements in the Situation

The price comparisons presented here do not tell the whole story. Although the price-parity relationship

FIGURE I

Relationship of Prices Received to Parity, 1930-52

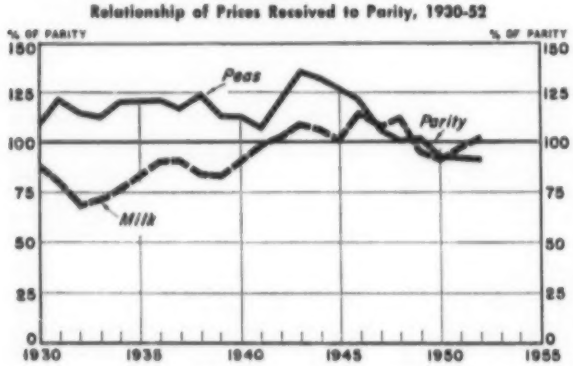


FIGURE II

Relationship of Prices Received to Parity, 1930-52

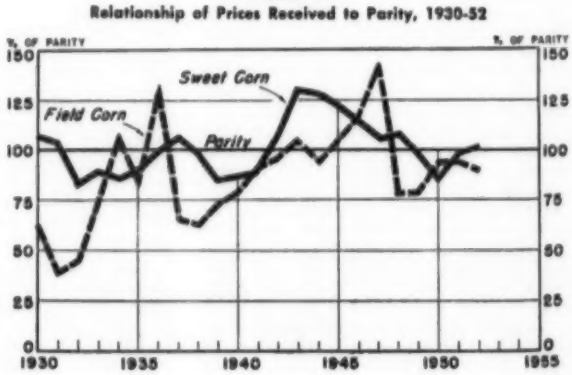


FIGURE III

Relationship of Prices Received to Parity, 1930-52

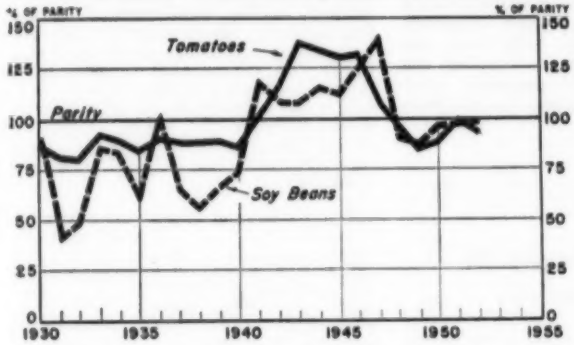
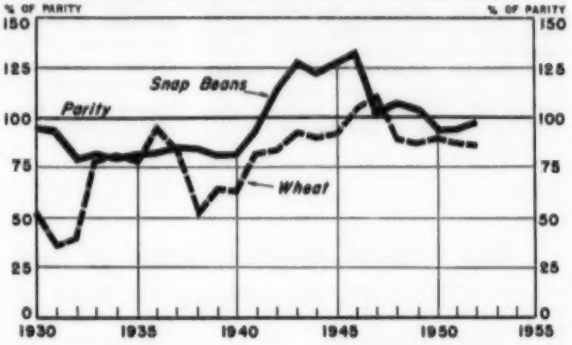


FIGURE IV

Relationship of Prices Received to Parity, 1930-52



may appear to be favorable, or at least give the canning crop an even break in competition with a field crop, this is not necessarily so. If the production-harvesting operation for the canning crop is less susceptible to mechanization than that of the competing field crop, as it frequently is then the relative price must be considerably higher to attract growers. Even this premise assumes availability of labor which in some cases may be the limiting factor. The production of most field crops today is much more highly mechanized in relation to the 1910-14 parity base period than is the production of canning crops. Furthermore, the very nature of some of the canning crops precludes future mechanization to as great a degree as now exists for the grain crops.

The payment by government to farmers of prices that amount to 90 percent of the parity price for the so-called basic commodities has guaranteed the farmer a price each year that may have been quite different from the price he would have received on the open market without price supports. The lack of such a price floor for canning crops, during the past five years, has placed them at a real competitive disadvantage. The field crops that have been supported at 90 percent of parity have not had lower prices to bring over-production into balance with demand from year to year. Even though total production may have exceeded consumption by 10, 20 or 30 percent, the price the producer received was still the same as though production matched consumption. On the other hand, purchasers of canning crops have had to make price adjustments to compensate for varying production-demand relationships.

What Can Be Done?

Without price supports for canning crops, the problem of successfully competing every year with field crops grown in the same area is difficult to solve. One approach to the problem is that of improving efficiency of the production of canning crops so that the unit cost of producing becomes low enough for the producer to obtain a net return per acre that is comparable to the net return he could expect to receive from an acre of the competing field crop or other commodity. All of the various services that canners are now rendering to their producers in the way of disease and insect control, harvesting, hauling, etc., are methods of accomplishing this purpose. The greater the degree of mechanization that can be used in the production and harvesting of the canning crop, while at the same time yields are boosted to efficient highs, is a combination that will stand the producer as well as the canner in good stead now and in the future.

Educational Program

Perhaps an educational program can also help in the present situation. I doubt whether many people, including canners, fully realize the apparent stability of prices for canning crops when they are related to their parity prices. Figures I, II, III, and IV show the remarkably greater stability of canning crop prices in relationship to their parity prices. This indicates that the normal operation of the competitive and economic forces in the field of agriculture and in the canning industry have effectively operated to assure the producer a price for his canning crop which was, over the long haul, more fair and equitable than the price that he received for competing field crops. Even in a comparison of the 1952 prices paid producers for canning crops with the prices producers received for competing commodities, the relationship to parity is favorable for the canning crops. Without exception, all the major canning crops returned to the producer last year a price that was equal to 90 percent or more of parity. This was not true of the prices received for two of the principal competing commodities, corn and wheat. Since the parity concept is not as frequently applied nor shown in relationship to actual season prices for canning crops, not many people realize the true relationship of the prices farmers received and the parity price for these commodities.

Another point that might be included in an educational program concerns the farmer's share of the consumer's dollar. The latest available figures in 1952 from the Bureau of Agricultural Economics of the U. S. Department of Agriculture show that for canned fruits and vegetables as a group the farmer's share of the consumer's dollar is now 36 percent greater than it was on the average during the period 1935-39. For the various individual canned items the change from 1935-39 to 1952 was as follows:

Canned peas—a 73 percent increase in the farmers' share; canned peaches—up 43 percent; canned tomatoes—up 31 percent, and canned corn—25 percent higher.

In comparison, other major foods showed the following changes in the proportion of the consumers' dollar going to the farmer:

Meats—up 30 percent; bakery and cereal products—up 24 percent; dairy products—farmers' share increased 12 percent; and fresh fruits and vegetables—up 8 percent.

The farmers' share of the consumers' dollar for poultry and eggs has actually decreased 9 percent from the 1935-39 average.

The average percent of the retail price going to the various operations from farm to consumer for four major canned vegetables in the 1949-50 season according to the U. S. Department of Agriculture was as follows:

To the farmer (raw produce)	23.2 percent
Retail margin	19.9 percent
Supplies—canning	17.1 percent
Indirect operating expenses in canning	9.1 percent
Selling and administration (canner)	8.5 percent
Director labor in canning	6.6 percent
Wholesale margin	5.7 percent
Transportation	5.1 percent
Warehousing and Shipping—canner	3.3 percent
Canners' gross profit	1.6 percent

These comparisons of prices of canning crops with the prices of competing commodities have revealed that canning crops compare favorably with the prices of competing crops when related to their parity prices. However, despite prices at or near parity for the canning crops, the greater degree of hand labor required for producing some of the canning crops places them at a competitive disadvantage.

Helpful activities in meeting today's problem, it seems to me, are increased production efficiency, extending the canner services now rendered to the producer, educational programs, and learning the facts about parity-price relationships.

The Federal Antitrust Laws as they Apply to Collective Bargaining for Raw Materials

By J. Harry Covington,
Office of Counsel,
National Canners Association

When I was informed that I was to have a part in this Session on Raw Products Procurement, it was first suggested that I explain to canners *all* of the possible legal pitfalls that might be encountered in bargaining with growers. I certainly would not have the temerity to undertake so formidable a task at any time, least of all in a single speech. Perhaps I am directly responsible for suggesting that it might be appropriate to limit the subject matter to a discussion of the application of the federal antitrust laws to collective bargaining for raw products. If so, I must still confess a degree of guilt for setting a very large assignment for a relatively short space of time.

Probably the title should have employed the words "collective action" rather than "collective bargaining" for the latter phrase has acquired a rather specialized meaning when used in connection with labor negotiations. I am not today using the term in that restricted sense.

Collective action in bargaining for raw products, theoretically, might be engaged in either by groups of canners or groups of growers or the two groups working together. As I hope to make clear, the legal implications of each are quite different. In treating canners as a group and growers as a group, the unhappy thesis I have to present is that what is sauce for the goose is not necessarily sauce for the gander.

Among the reasons why those responsible for arranging this program thought this subject might be timely is the fact that several complaints have recently been filed by the Federal Trade Commission involving grower cooperatives. One of these has been brought against canners; and two others against grower organizations.

Many of you, I am sure, are familiar with those arising out of the activities of Cannery Growers, Inc., of Ohio, the Florida Citrus Mutual, and The Appalachian Apple Association. No attempt will be made to assess the merits of the complaints filed, but they are important to note as indicative of the thinking of at least one of the federal enforcement agencies in this area—the Federal Trade Commission.

The federal antitrust laws consist of a number of enactments by Congress. You all, no doubt, at least know by name the Sherman Act of 1890, the Clayton Act of 1914, and the Federal Trade Commission Act.

At the outset it should be pointed out that these acts apply only to interstate commerce—that is, to transactions in or affecting commerce between different states. In addition, most states have their own antitrust laws that are applicable to intrastate transactions as well. Growers who operate solely within a single state and sell to processors who in turn sell their products only for local consumption may not be engaged in interstate commerce and subject only to the state laws.

Even though I only mention state laws, I caution that you should bear in mind that whatever form of cooperative activity they may sanction, they afford no immunity against federal prosecution to anyone subject to the federal laws. For example, the Ohio Cooperative Agricultural Act (Ohio General Code, § 10186-23) specifically recognizes that there may be collective bargaining by purchasers from Ohio cooperatives. A state law of this kind, however, grants no comprehensive license or immunity to canners to engage in collective action on their own in any transaction involving interstate commerce. Action taken by canners, not pursuant to private agreement, but in compliance with a state statute, such as pro-rate law, may, however, be lawful even where interstate commerce is affected. (*Parker* v. *Brown*, 317 U. S. 341, 350 (1943).) The Sherman Act operates on persons or corporations, not on states.

It is safe to assume for the purpose of this discussion that growers who produce crops for canners who sell the processed products in interstate commerce are themselves engaged in interstate commerce and thus subject to the requirements of the federal laws. Both growers and canners are in the words of the Supreme Court "an inseparable element of a larger program dependent for its success upon activity which affects commerce between the states." (*Mandeville Island Farms Inc. et al.* v. *American Crystal Sugar Co.*, 334 U. S. 219 (1948).)

Simply to read to you the pertinent provisions of the antitrust statutes would not be very illuminating. Instead, it is preferable to keep in mind the principal prohibition of the Sherman Act. This statute in Section 1 outlaws every unreasonable contract combination or conspiracy in restraint of trade or commerce. (26 Stat. 209 (1890) 15 U. S. C. § 1.) The Trade Commission Act may for purposes of this discussion be considered as one to enforce these same prohibitions. The only distinctions from your point of view are the agent of enforcement and method of enforcement. The Department of Justice can, under the Sherman Act, seek a criminal prosecution or file an antitrust suit to enjoin continuation of certain practices. The FTC files a complaint which may result in an order to cease and desist from engaging in certain activities. No penalties attach unless there are further violations following the issuance of this order.

There is also a provision in the antitrust laws which permits an injured individual, as distinct from the government, to sue a violator of the antitrust laws for treble damages for injury to his business. A number of important cases involve such suits. Proof of actual damages in these private actions is often difficult, as it should be, in view of the threefold penalty concepts involved.

Lastly, a private suit may be brought under the statute for injunction by anyone threatened with irreparable injury by a violation of the antitrust laws. (*Hinton et al.* v. *Columbia River Packers Assn., Inc.*, 131 F. 2d 88 (9th Cir. 1942).)

Let us first see how these antitrust laws apply to canners. The law forbids every "unreasonable" contract or combination in restraint of trade. You may now well ask what does this mean insofar as it relates to your actions in the purchase of raw products. There are many special and individual situations that might arise which present problems as to which the law is far from clear and which could be the subject of endless legal debate. I have no intention of invading this field today. There are, however, areas of conduct about which the lines of legality are more clearly

defined. Antitrust lawyers call these *per se* violations.

Canners cannot legally combine to agree on the prices to be paid to growers for canning crops. Prohibition against such combination includes agreement on maximum or minimum prices to be paid growers. The Sherman Act requires that the prices paid growers individually, or organized into a cooperative, must be determined by each canner acting independently without any express, tacit, direct or indirect agreement with other canners.

The leading case is the *Mandeville Island Farms* case involving the California beet sugar industry. California beet sugar refiners had long had a practice of paying to growers prices based on the sugar content of beets delivered and a percentage of the refiner's net returns. As a result, widely varying prices were paid by different refiners to growers in the same producing areas.

The three refiners then agreed among themselves that they would base prices to growers on the average net returns of the three companies. From this agreement there resulted payment of identical prices to growers for sugar beets. The Supreme Court found that the agreement eliminated competition among refiners in the purchase of beets. It held the agreement to be unlawful under the Sherman Act as a price fixing agreement. Thus fixing of prices to be paid growers either directly or indirectly is illegal.

Likewise illegal would be any agreement among canners allocating the growers from whom each will purchase, or any agreement not to deal with any group of growers. In other words, a group of canners clearly cannot collectively boycott a group of growers whether organized or not. The complaint which was filed by the Federal Trade Commission against a number of processors of tomato products in Ohio charged in part that the canners through agreement refused to deal with growers who were members of a growers cooperative formed in that state. This charge was emphatically denied and the case is now being tried. The complaint, however, is indicative of the type of collective activity which, if proved, would be considered illegal by the Commission.

The Ohio complaint suggests one other area in which canners should exercise caution. In that case, there is a collateral charge that the canners conspired together to induce a breach of contract between growers of tomatoes and the cooperative. This charge was also denied.

Even absent a conspiracy charge, a canner may ask whether he might be sued for illegal conduct if he individually deals with a grower who is a member of a cooperative without the approval of the association. There is not time today to consider the many legal ramifications of that question which is controlled not by the federal antitrust laws but by state laws. It is possible that one may be sued for inducement of breach of contract under general principles of common law and damages collected if any can be shown. There are also penalties for knowingly inducing a breach of contract provided under some state cooperative acts. Such statutes often provide for fines as well as the collection of damages by the cooperative. This does not mean that in all such cases a canner can be held guilty of inducing a breach, but it does suggest the exercise of a degree of caution. Today I am limiting my comments to what is done by combination or agreement in violation of the federal antitrust laws.

It is important to understand that in using the word "agreement," I am not necessarily speaking of an actual agreement as you may know the word and certainly not of written agreements. There are numerous cases in which agreement has been "inferred" from the actions or undertakings of a group of individuals. The legal cant is "conspiracy, combination, agreement, or common course of action." Mere discussions among canners of prices or the possibilities of contracting or not contracting with a group of growers might give rise to an inference that an agreement existed.

One must also remember that the Federal Trade Commission is apt to infer that a conspiracy existed from evidence that might not sway a jury. In some instances actions may speak even louder than words. Evidence as to where a man ate his dinner, how long it took him to join his wife after a meeting, or even how much he then weighed may all appear at a hearing on conspiracy charges. You have only to read the transcript of the proceedings in an FTC case now being litigated to find just such evidence permitted as bearing on the existence of an agreement.

Some of you may have heard Mr. Austern in the past tell Abraham Lincoln's story about how an agreement can be inferred. If all of the farmers in a single county whittled on sticks during the winter, and then in the spring met at the county seat where it turned out that the notches whittled by each man precisely matched those whittled by all of the others, Abraham Lincoln said that nobody could tell him that there had been no agreement.

There are, I believe, a number of students of the Bible on the Commission staff. There is an oft-quoted verse in the Old Testament which asks, "Can two walk together, except they be agreed?" There has been some indication that the Commission takes this as its text—and the fact that two competitors politely lunched with each other proves that they agreed on everything from women to whiskey.

The clearly prohibited courses of conduct that I have mentioned to you are, probably, all familiar to you. The basic question, however, is why if it is illegal for canners to agree among themselves on contract terms is it not equally illegal for growers to organize and present a united front to the canners in their contracting.

The answer lies in the specific exemptions for farmers in the statutes. The federal antitrust laws afford special treatment to producers of agricultural commodities. Section 6 of the Clayton Act of 1914 (38 Stat. 731 (1914) 15 U. S. C. § 17) provides that:

> "nothing contained in the antitrust laws shall be construed to forbid the existence and operation of labor, agricultural, or horticultural organizations, instituted for the purposes of mutual help . . . nor shall such organizations, or members thereof, be held or construed to be illegal combinations or conspiracies in restraint of trade under the antitrust laws."

Even so, farmers were somewhat apprehensive about the Clayton Act exemptions because they covered only non-stock cooperatives operated not for profit. To do away with these objections they succeeded in having enacted in 1922 the Capper-Volstead Act (42 Stat. 388 (1922) 7 U. S. C. § 291, 292) to include stock associations within the definition of agricultural associations and to clarify their exemptions under the antitrust laws.

The Capper-Volstead Act provides that growers may act together in associations, in collectively processing, preparing for market, handling and marketing in interstate and foreign commerce agricultural products produced by them and they may make all contracts necessary to effect such purposes. This means that growers may agree in advance on the prices to be charged for their crops and may delegate all the functions of contracting to cooperative associations. The result may well be that if all growers in an area are members of a cooperative, canners will be forced either to bargain with the growers association or do without a particular raw commodity.

This exemption applies to agricultural producers. There is a companion exemption in the Fisheries Cooperative Marketing Act (48 Stat. 1213,

(1934) 15 U.S.C. §§ 521, 522) applicable to fishermen supplying fish packers.

Although the exemptions under the Capper-Volstead Act granted agricultural cooperatives are broad, Congress recognized that such associations could become monopolistic and in effect restrain trade. The statute specifically provides that "if the Secretary of Agriculture shall have reason to believe that any such association monopolizes or restrains trade in interstate or foreign commerce to such an extent that the price of any agricultural product is unduly enhanced . . ." he may issue a complaint against the cooperative. If it is found guilty, the Secretary can order it to cease and desist from the practices which result in the undue enhancement of prices. The Fisheries Cooperative Act contains a similar provision.

The Secretary of Agriculture has not to my knowledge ever issued a complaint under the Capper-Volstead Act. Numerous bills have been introduced in Congress over the last few years to transfer his function under the Act to the Department of Justice. One has been presented at this session but just what its chances of passage are I do not know. It is safe to assume, however, that the sponsors believe that if the function were transferred, the Justice Department would make a far greater use of this section than has been made by the Department of Agriculture. Just whether or not this would be the result is open to speculation, particularly in view of the fact that many persons believe that the authority of the Department of Justice overlaps that of the Secretary of Agriculture under the statute as presently drafted.

There are other limitations on the exemptions afforded cooperatives. It should be noted that the Act permits growers to act together only in *marketing* their products. Nothing in the Act permits them or their associations to limit the amount of any product that may be grown or the type of product to be grown in any one season. (*United States* v. *Grower-Shipper Vegetable Association of Central California*, (N.D. Calif. 1951).)

Although not within the scope of my subject today, I should point out that there are also additional exemptions from the antitrust laws contained in the Agricultural Marketing Agreement Act which provides that the comprehensive marketing controls permitted in orders issued under that Act will not be considered to violate the law. Authorization for marketing agreements on most canning crops are not included in orders issued under the federal act but there are a number of state laws authorizing agreements or regulatory schemes on canning crops.

Most important to note is that the Capper-Volstead Act exemption applies only to growers acting in cooperation with each other, and grants no exemption if the producers include in their arrangements to control marketing others such as canners.

The leading case on this point is the *Borden* case with which some of you may be familiar. (*United States* v. *Borden Co.*, 308 U. S. 188 (1939).)

In that case the government charged a cooperative association of milk producers, certain distributors of milk, the milk wagon drivers union, municipal officials of the City of Chicago, and certain others, with a combination arbitrarily to fix, maintain and control artificial and non-competitive prices to be paid to producers for milk and to be charged by distributors in the sale of milk in the City of Chicago, and to control the supply of milk moving into the City of Chicago. The District Judge thought that the Capper-Volstead Act had so modified the Sherman Act as to exempt the producers cooperative from its provisions and dismissed the indictment.

This the Supreme Court held was wrong. Nothing in the Capper-Volstead Act, the Court said, gave producers of milk the right to join with distributors, labor officials, municipal officials and others to maintain artificial and non-competitive prices for milk, to compel industry distributors to charge the same price, or to control the supply of milk brought to Chicago. The fact that the milk producers did not limit their agreements to themselves but agreed with other groups rendered the entire action illegal and beyond the scope of the Capper-Volstead exemptions.

This discussion is designed to be of assistance to canners in their raw material dealings with cooperative associations. We should not lose sight of the fact, however, that many growers' associations operate their own processing plants. The question is then inevitably asked whether two or more cooperatively owned canneries can avail themselves of the protection afforded by the Capper-Volstead Act and undertake to agree on the prices to be charged for the processed product. The language of the statutory exemption is probably sufficiently broad to permit such an interpretation. Agreement on prices between cooperatively owned canneries, however, while possibly in accord with the purpose of the Capper-Volstead exemptions, are one step removed from the grower level and might be subject to critical scrutiny by the courts. The interest of the consuming public would be brought into sharper focus.

Two complaints have recently been filed against cooperative marketing associations by the Federal Trade Commission charging that the producers carried their activities beyond the exemptions afforded by the Capper-Volstead Act. One was brought against the Florida Citrus Mutual in December. This complaint charged that the Mutual controlled the marketing of citrus fruit by obliging purchasers from them to follow rules and regulations affecting their conduct after they purchased fruit from the sellers, that they sought the agreement of purchasers of citrus fruit in the matter of establishing floor prices and shipping schedules and required purchasers to agree with the Mutual to handle only citrus fruit of members of the Mutual, to devote their processing facilities only to the processing of fruit of members of the Mutual and subject further to the understanding that if exceptions were permitted, non-member fruit purchased would be subject to the same terms as provided by contracts of the Mutual. It is not, however, entirely clear from the FTC complaint just where the violations of the law lie in the price fixing phase of the charges.

The State of Florida has been granted the right to intervene. The petition requesting this right declared that the State has been vitally interested in the Mutual's program and expressed belief that it might be preserved without violation of any law.

An earlier complaint was filed by the Trade Commission last September against The Appalachian Apple Association, Inc., a trade association controlled by its grower members but including in its membership the principal processors of apples. The gist of this complaint is that the trade association, through its internal committee mechanisms, fixes the price of apples that processors will pay to growers, and further fixes the price differentials between various grades and classifications of apples, and in order to avert price breaks provides for the diversion of shipments from one processor to another as may be required by circumstances.

The theory of the Commission apparently is that because the organization includes non-growers as members, it is outside the protection of the Capper-Volstead Act. Without such protection the association would be regarded as a trade association and thus unable legally to function as the medium of a price agreement among its members. The Commission in trying this case attempted to proceed on this theory. The question remains whether, absent any independent agreement on the part of processors or growers, the mere fact that the two groups sat down together to bargain collectively is evidence of illegality.

There is still another important limitation on the exemption afforded cooperatives under the antitrust laws. It is unlawful for a grower cooperative to require a canner to limit his buying to purchases from growers who are members of the cooperative. This is very clearly brought out in the case of *Hinton et al.* v. *Columbia River Packers Assn., Inc.*, 131 F. 2d 88 (9th Cir. 1942). In actual fact that case involved the companion Fisheries Cooperative Marketing Act, (48 Stat. 1214, 15 U.S.C. §521, 522) rather than the Capper-Volstead Act. The Pacific Coast Fishermens Union embraced most of the fishermen in the Oregon, Washington, and Alaska areas. It required its members to sell only to packers who contracted with the Union under a uniform contract by which packers agreed to refrain from purchasing from fishermen not members of the Union. One of the major Oregon packers had been notified by the Union that it would be unable to purchase fish from union members if it failed to sign a contract. The District Court held that the Fishermens Union went beyond the market arrangements authorized by the Fishermens Cooperative Marketing Act. In other words, it was held that the immunity from the antitrust laws provided by the Act did not justify the exclusive purchasing features of the contract which the Fishermens Union offered packers. I will not dwell on all the legal aspects of this case but the argument was made that other laws applied as this was in fact a labor dispute. When after going to the Supreme Court the case came to the Circuit Court of Appeals a second time, that court held that the Sherman Act was violated by this contract. Incidentally, this was a private lawsuit rather than a government prosecution.

A somewhat similar case is *Manaka* v. *Monterey Sardine Industries*, 41 F. Supp. 531 (N.D. Calif. 1941), which was decided in the District Court for the Northern District of California in 1941. That case involved a suit for treble damages by fishermen under contract to sell to a canner against a boat owners association and a canner. This association rented boats to fishermen and acted as a marketing agency for their fish. The Court here, too, held for the plaintiff on the ground that the association's activities prevented the plaintiff from selling fish to a canner and were in violation of the Sherman Act. The Fisheries Cooperative Marketing Act gave no immunity to a marketing association which prevented a non-member from marketing his fish.

These limitations on the exemptions afforded cooperatives are of interest to as possibly suggesting some provisions that can be considered objectionable on legal grounds in particular situations. Necessarily, the general caution must be given that oversimplified general rules can be applied in specific cases only with the guidance of your own counsel who knows all of the facts. The *Hinton* case indicates that one might legally object to any requirement in a contract that purchasing of the raw products in question be confined to members of the cooperative. Likewise, if a cooperative permitted purchases from non-members but required in its contract that all prices paid non-members be the same as the contract price provided for members, legal objection would be warranted since it would in effect be an attempt to control the price for the entire market.

This in turn raises a question as to whether or not a cooperative may lawfully include in a contract a clause to the effect that if a canner purchases from a grower who is not a member of the cooperative at a price higher than specified for members under the contract, all purchases from members shall be at such higher price. Such a clause would in theory permit purchases from non-members at any price the canner chose to pay. The practical effect would in many cases, however, be to limit such purchases from nonmembers to a price no higher than that specified for members in the contract, particularly where a canner makes large-scale purchases from cooperatives. Questions of illegality under the Sherman Act arise where the effect of such a clause is to deprive a non-member grower of an established market. This accordingly suggests to canners legal evaluation of this type of contract clause at the time of entering into any arrangement with a cooperative.

Perhaps the prime point for you as canners to bear in mind in considering the exemptions of cooperatives is that they are limited to producers acting by and among themselves. The immunity afforded cannot be carried over to an otherwise illegal combination or understanding involving, along with producers, any other group.

Thus far I have suggested to you some of the things that canners cannot do under the antitrust laws, indicated a number of things that growers can do, and at the same time suggested some limitations on their immunities. Your next question would logically be to ask what may processors do to meet the bargaining power of cooperatives under the antitrust laws as they exist today. The implications of this problem will be discussed by Mr. Austern, but as an introduction to what he may say later I might mention the suggested possibility of a type of limited collective bargaining by canners.

Following the Supreme Court decision in the *Borden* case a consent settlement was reached with the government which provides that nothing contained in the decree shall prevent the various defendants, including the processors, from bargaining collectively with each other or from making or entering into lawful contracts concerning prices, terms and conditions for the purchase and sale of milk.

The fact that the government permitted such a provision to be included in one decree is certainly no indication that collective bargaining by canners is lawful under all circumstances. It does, however, show that in a particular situation the Antitrust Division of the Department of Justice was willing to accept a marketing procedure which included some type of limited collective bargaining. This might mean that canners may meet and confer jointly with cooperative representatives at which time terms and prices which will apply to contracts with all purchasers may be settled.

Whether such an arrangement would have any meaning without a prior or tacit understanding by canners that none will sign unless terms are proposed which are acceptable to all is questionable. I am frank to say that I am hesitant to express an opinion on the legality of such an agreement. Certainly, any separate, independent agreement by canners as to the terms they would demand from a cooperative would be hazardous.

A decade ago a group of companies purchasing cheese in Wisconsin were ordered by the Federal Trade Commission to cease and desist from bargaining with a large number of producers at meetings held under the supervision of the State Department of Agriculture. As contributing to the illegality it was specifically found by the Commission that the purchasers agreed *in advance* of the meetings as to the initial prices they would offer and the upper limits of prices they would pay. *In the Matter of Badger-Brodhead Cheese Company, et al.* 31 FTC 1017 (1940).

In sketching for you the necessarily vague outline of what is legally permissible for a canner to do and pointing out wherein to some extent growers may do more, I have endeavored to state as objectively as possible what I believe to be the law as developed to date. I have tried to tell you what the law is without attempting to state what it should be.

Lastly, you must know that when faced with fairly ambiguous statutes lawyers may differ in their interpretations. We have no particular claim to wisdom—and no special key to the meaning of judicial decisions. Many points I have mentioned today may be the subject of some difference of opinion. The most I can hope is that what I have offered has contributed to your knowledge of the subject and perhaps provoked a sufficient interest to suggest further individual exploration. That is after all the primary function of the Association—to stimulate thought and inquiry rather than to attempt the solution of specific and individual problems.

How Can We Interest More Farmers in Growing Our Canning Crops?

By J. E. Countryman,
California Packing Corporation

The procurement of raw products of desired quality and at competitive prices has always been one of the canner's major operating problems. This problem has been intensified in some areas by growers' organizational activities aimed at collective bargaining to determine prices and other contract provisions. Such activities will not be a part of my discussion.

The approach to my topic will be an attempt to present briefly for your consideration some ideas for a grower's program designed to create a satisfactory individual business relationship between grower and canner.

There are a few observations that should be made at the outset of this discussion. I know that you recognize that the subject is so complex and has so many ramifications that it is not possible in the time allotted to present all pertinent points. Also, there appears to be no single complete grower's program that will be equally effective in each sector of the United States where canning crops are grown. Even though the same crop may be grown in different sections of the country, the types of growers differ between areas as do the agricultural practices, the intensity of competition from other crops, the competition between canners, etc. This leaves us with a consideration of only those policies that have application throughout most of the country, and a consideration of these policies as they apply to the procurement of annual crops for canning.

In approaching this problem, let us see if we can lay down some premises on which to base proposals for inducing more farmers to grow canning crops and for inducing those who are now growing to continue. It can reasonably be assumed that the production of canning crops must be profitable to the farmer to the extent that he will receive at least as much net return per acre from canning crops as he can obtain from competing crops; otherwise, he will not be interested in growing canning crops. It also seems logical to assume that the production of canning crops must be a *pleasant* experience comparable with the production of other crops and that inducements other than competitive monetary returns must influence to a considerable extent the farmer's decision to produce canning crops. These two premises could well lead to the adoption of a slogan for grower transactions, "Profitable and Pleasant." Virtually everything we do to develop new growers and to maintain present suppliers of raw products falls into two general classifications.

Let's dispose of the profit factor first, because this probably is the less controversial and the less complicated in our consideration of a program that will be attractive to farmers. You will notice that I have not used the word "price", because price is only one of the factors in a grower's net return. Production costs, yields, utilization of crop residues, and benefits to future crops all influence net returns realized by the farmer in the production of a canning crop. In the final analysis, the sum of all these factors must yield a grower a return equal to or better than he can receive from other available crops.

The normal manner of presenting canning crop prices to farmers is through the medium of a crop contract. If the canners adhere to the stated contract prices, the farmers in general will be satisfied if the prices are fair and properly established. It is the field of price, however, where we bump into some practices that disturb grower relations; that is the offering by a canner of special incentives and behind-the-door deals in an attempt to obtain additional tonnage. While such practices are not universal, they are prevalent enough in some sections of the country to be a decided disruptive factor in grower relations.

Now let us consider the grower-processor relationship factors other than profit which influence a farmer to produce canning crops. These influencing factors will in many instances tie into and influence the price factor. They are grower services, the grower contract, and last, but not least in importance, the personal relationship of the canner with the farmer.

Services to growers is a broad subject in itself. It involves doing things for growers that they do not want to do for themselves or that they cannot reasonably be expected to do. Such services include soil testing; crop programming; the performance by the canner of planting, cultivating, and harvesting operations; advice to the farmer about cultural practices, fertilizer recommendations, methods and means of more economical harvesting, to name some of the more important. The type and scope of these services naturally will vary between different areas of the country. They are most effective when the canner conducts a vigorous agricultural research program to supply the answers to specific local crop production problems.

The grower contract is an important factor in farmer relationship, especially when attempting to obtain new growers. New growers usually read a contract, while old growers don't. The contract is really a sales as well as a legal document. A good grower's contract was properly described in these words by H. Thomas Austern in his comments on this subject at the 1949 N.C.A. Convention: "A good sales contract must embody not only a correct legal statement but some element of salesmanship—the most essential one being that it can be understood by the buyer without recourse to a battery of lawyers. Every grower contract should embody the essence of good canner-grower relations. This means, I think, that the contract should be in plain English, preferably in Saturday Evening Post style." Preparation of our contracts along these lines with provisions fair to both parties will at least not scare the grower to death as do some of our existing documents.

The next and last factor that we will consider is our personal relationship with the farmer. Too frequently the grower is the forgotten man from the time his last crop delivery for the season is made until the canner is ready to contract for the next year's crop. Instead of allowing the farmer to forget the canner during this period, this should be the time for the fieldmen to cement good relations with the growers; visiting them to discuss crop programs, cultural practices, fertilizer recommendations and land selection for the next season's canning crops. Grower relations programs can include news letters, bulletins, prizes of outstanding achievement, group meetings, and other similar practices —devices to keep the farmer thinking about growing canning crops.

Grower relations are inherently a part of public relations, and so a brief discussion here of public relations would seem to be in order. Public relations for the canner is rather a broad subject, but seem to be aptly described by Hal Jaeger in his recent outline of a public relations program for the Wisconsin Canners Association: "To engage in a program of public relations is basically to build credit in the eyes of the public for honest, decent commercial behavior. The job of public relations is to favorably translate such behavior to the public, thus to establish a mutual understanding and respect." Although some canners follow a good industrial relations program, this is the field in which some of us seem to fall down by tending to avoid local publicity, which is false modesty.

Canners should seize upon every opportunity to impress upon the local community the many good things they can tell about themselves, such as payrolls, grower payments, research ac-

tivities, labor relations, grower relations, participation in local activities, and many more. We should build up in the local community a pride in working for our company, in growing crops for it, and in having contacts of any nature with it.

We cannot get into the field of grower and public relations without considering our number one contact—the fieldman. Fieldmen are prime factors in the field of public relations. They make our operating policy and our public relations program effective as it applies to growers. To do this, the fieldman must first of all be a salesman, also an agronomist, a horticulturist, an entomologist, a mechanic, and a psychologist who understands each farmer's reactions.

The selection, training, and guidance of our fieldmen is of utmost importance. Because details of his activities cannot be the same for any two different areas due to inherent grower and crop differences, we are faced with the necessity of analyzing each territory in which we operate and training our fieldmen accordingly.

Whatever we do in the way of selling ourselves to the growers will greatly increase chances of securing new contracts and keeping old growers. A sound, aggressive growers' program requires a lot of good, hard work. It is a program that too many of us talk better than we do. It should never be forgotten that we need the growers more than they need us and that we will have growers only so long as their relationship with us is profitable and pleasant.

The Legal Implications of Collective Action by Growers

By H. Thomas Austern,
Chief Counsel,
National Canners Association

During the course of the many discussions my colleagues and I have had about the legal limitations on canner action to meet collective action by growers, I have often been reminded of a famous New Yorker cartoon. In it the client resides in a prison cell, and outside his distinguished lawyer is vigorously exclaiming, "They can't do this to you!"

As Mr. Covington so aptly put it, the fundamental legal difficulty is that what is lawful sauce for the goose is often illegal for the gander. A combination of growers to raise raw material prices, to impose unreasonable trading terms, to liberalize the grading of raw material—so as to require acceptance of a higher percentage of culls—or otherwise to enhance their economic bargaining position is lawful so long as certain simple forms are preserved. Yet most defensive efforts by canners similarly to combine to maintain equality of trading position are legally hazardous.

The tendency to get rhetorical—and on the part of some canners occasionally profane—about this situation is irresistible. Our antitrust laws are basically designed to preserve competition and to maintain individual freedom of action. Monopoly, predatory pricing tactics, tying arrangements, and combinations to to restrain trade are prohibited because they are believed to destroy that freedom and equality of economic opportunity which is called the American system of free enterprise.

Both the Clayton and the Capper-Volstead Acts were intended to fit into this basic concept. They were enacted many years ago because Congress then believed that inequality of bargaining position existed in the case of some agricultural commodities between small farmers and certain types of distribution outlets for farm products.

But it is clear that neither statute was designed to promote monopoly or overreaching on the other side of the picture. True, this counterbalance was expressed only somewhat hopefully in the authority given the Secretary of Agriculture in the Capper-Volstead Act to admonish a grower group and to restrict its operations if they resulted in unduly enhancing the price of any agricultural commodity. Historically, as Mr. Covington has told you, even this mild power of governmental chastising has never been exercised.

Nor need I elaborate for this audience certain economic realities. Dr. Stier has outlined for you the relatively better return that growers get on canning crops. Most informed and forward looking growers, I am confident, are deeply aware of the community of interest they share with the processors to whom they sell. They know that if canners are required to take poor raw material, there must be burdensome sorting and excessive trimming at very high labor costs. The hazards of failure to meet Food and Drug requirements with resulting seizure are increased. Even more important, over-all quality for which canners strive may be diminished.

Competition in canned foods, indeed all foods, is a seamless web whether it be viewed for a season or, as it should, for the long pull. Inescapably, the grower can reasonably share only in what the processor can persuade the consumer to pay. Any product, or that part of the pack produced in one area, can price itself out of the market temporarily—and even permanently if the lost production is economically developed elsewhere. When that happens both canner and grower suffer.

No Congressional inquiries, no administrative proceedings, no statutory exemptions, and no legalized marketing arrangements can change these penalties flowing from the operation of economic law.

Likewise, there is little point in any attempted moralizing about these legal rules. Many of you have often questioned the democratic fairness of a legal framework that can result in one side having its hands tied and the other being given an economic javelin. Sometimes people assume erroneously that there must in any legal system always be something equivalent to a right of self-defense. Unfortunately, this is not true. Philosophically, law is supposed to be the formalization of morals—but it occasionally happens that a rule of law originally so derived can sometimes be applied to create situations that appear unconscionable. In large measure this is why we interpose juries between the law as announced by the judge and a criminal defendant. It also underlies the favorite expression of lawyers that hard cases often make bad law.

Hence I shall endeavor to deal with these problems as pragmatically as possible—recognizing that we must start with the law as we find it. Ten years ago Judge McCulloch in Oregon summed up the approach of a judge when he dismissed an antitrust monopoly indictment against a dairy cooperative. In doing so, he said:

> "It may be that the acts of the defendant cooperative . . . are monopolistic in character . . . it seems to me when Congress said that cooperatives were not to be punished, even though they became monopolistic, it would be . . . ill-considered for me to hold to the contrary." (*United States v. Dairy Co-op Association*, 49 F. Supp. 475 (D. Oregon, 1943))

Fortunately, that is no longer a correct statement of the law, but it does express a point of view.

Moreover, while practicality is always desirable, any lawyer venturing to discuss what is permitted conduct within the vague contours of the antitrust laws is always walking on eggs. The caution is hardly needed that in discussing general principles, I am *not* advising about particular local situations. No competent counsel could do so without the full and specific facts—and the National Canners Association, through its counsel or anyone else, never has dealt or does

deal with particular local problems in specific areas. That is beyond its function.

To generalize, then, let us suppose that most of the growers of Commodity X, in two contiguous states, A and B, are persuaded to join together within the permitted statutory format of the Capper-Volstead Act. The combined group decides that the price per ton or other unit must be doubled, that raw material grades must be lowered, and that all contracting must be done through some organization to which a specified chock-off commission must be paid. They also bind each of their grower members by contract.

What may the canners in these areas do if it seems plain that these combined demands will preclude the packing of a satiafactory product that competitively can be successfully marketed?

Mr. Covington has succinctly outlined the legal prohibitions on concerted action by canners. It is my assignment to discuss with you—and again I emphasize only in general terms—what can be done without violation.

First, there is the perhaps obvious opportunity afforded by the Capper-Volstead Act to complain to the Secretary of Agriculture. In addition, there are some limits to what a grower group may lawfully do, and if they transgress these limits, one may complain both to the Federal Trade Commission and to the Department of Justice.

Realistically, in a seasonal industry this may be an illusory recourse. No government agency can act without a long preliminary investigation. Necessarily, it must select from many complaints those it will prosecute. Enforcement proceedings against agricultural groups have hardly been numerous, and we have the historical fact that none has ever been instituted by the Secretary of Agriculture.

Nevertheless, I venture to suggest that whenever you are advised by your individual counsel that a particular group has transgressed the proper legal limits, it might be desirable to file complaints with both the Department of Agriculture and these other enforcement agencies. The indicia of illegality have been indicated by Mr. Covington. Wherever it is learned that the combined grower program includes any restriction of production not specifically authorized by state law —or a requirement that the processor deal only with members of the group —or that in dealing with others he never pay more or less than what the group contract requires—there would probably be a legal basis for complaint. Moreover, wherever the conditions prescribed would result in what the Capper-Volstead Act calls "undue enhancement" of price, there are proper grounds for requesting governmental intervention.

Despite my doubts as to any timely or realistic relief flowing from these complaints in most instances, they would serve to make a public record and they would offer a basis for full publicity, the desirability of which can next be examined.

Generally speaking, I see no legal impediment to any canner or group of canners giving complete publicity to any situation that threatens to frustrate the economic life of a growing and processing community. So long as you stick to the facts, so long as this publicity is not part of a plan for boycotting, there is no legal reason why such publicity of the economic facts could not be undertaken even collectively.

There are perhaps some reasons why it should. The community of interest between the canner and the grower—and the inescapable fact that the grower's economic welfare is bound up with that of the canner—in a sense make it your duty to give every grower an opportunity to know the full facts. The American farmer is historically independent, hardheaded, and realistic. Agriculture as a way of life always teaches the dangers of excess in any form. Rural public opinion fundamentally is sensible and balanced.

By the same token every individual canner is entitled, directly and through his field man, to talk with his growers individually about the economic realities of the canning business and the apprehended impact of anything that threatens the economic future of both grower and canner alike. As Mr. Covington suggested, there is of course a line at which an educational effort may trespass into inducement of breach of contract or prohibited anti-cooperative action. Hence what you do probably ought to be done only with advice of your local counsel.

But so far as I know, no statute has curtailed the right of free speech, or the right of fully and frankly discussing business facts with those whose economic welfare is bound up with your own. I shall return to this fundamental problem of grower-canner relations in a moment.

In passing, I suppose I should also mention the availability of a private lawsuit that can be instituted by any individual canner, and also by a group of canners, to enjoin violations of the federal antitrust laws or for treble damages. Both the *Hinton* and *Manaka* cases, to which Mr. Covington referred, were private suits. In situations where you are advised that an economically destructive program is clearly outside the exemption, exploration of this possibility would be well warranted. Moreover, in an extreme case a temporary injunction is available, that is, a prohibitory order may issue even before the case comes to trial. Two years ago when a growers group in California entered upon a program to destroy lettuce in the fields, this attempted restriction of production was immediately enjoined by the Government by a temporary restraining order (*United States v. Grower-Shipper Vegetable Association of Central California* (N. D. Cal. May 18, 1951) CCH Federal Antitrust Laws No. 1084).

Here again the factor of public opinion ought not to be disregarded. Even an unsuccessful litigation often achieves publicity, and the resulting education can change the climate of local opinion. Obviously, since this factor of public opinion works both ways, suits to enjoin grower action are hardly indicated except where the announced program can reasonably be demonstrated as being beyond the statutory exemption.

Next there is the suggestion in at least one antitrust consent decree that canners have something called a right of "collective bargaining." I do not understand what this is. Nor can I perceive what practically it might accomplish, and I think it legally dangerous.

For the so-called right of collective bargaining seems to me to be merely the opportunity for the canners individually to assemble with the representative or representatives of the combined growers group to hear what is to be offered. There appears to be no clear-cut right for the processors group to meet either before or after to discuss what might be offered, what has been offered, or to formulate any joint counter-offer. The canners may possibly be permitted to "bargain collectively"—yet the law still requires that they act individually. Collective bargaining in this context seems to me to be merely collective listening by individuals. If all that it affords is the opportunity for collective argument between one combined group speaking through one man and a heterogeneous collection of individuals, restricted from talking with each other, I fail to see how it affords any real equality of bargaining.

Moreover, it always encounters the danger which Mr. Covington's discussion of the *Borden* case revealed to you. Except where a so-called bargaining session is part and parcel of a hearing under some explicit state control statute, there is always the possibility that a federal enforcement agency might claim that an over-all combination was achieved embracing both the growers and the canners beyond the exoneration afforded to the growers by the Capper-Volstead Act.

Nor does the solution to these possible difficulties—in the example posed—lie in what are so erroneously called federal marketing agreements, but should instead be termed government Licenses and Orders issued under the Agricultural Marketing Act.

As you know canning crops, with two minor exceptions, are not included in this complicated federal statutory structure. The reasons that led Congress eight times—between 1934 and 1947—to reaffirm this exclusion are still persuasive. Briefly, though some immunity under the antitrust laws is achieved, equality of bargaining is not established. Instead, it is considerably lessened. The fate of the canner is lifted entirely out of his hands and placed squarely and wholly in the hands of an administrative official.

When you remember the scope of control involved and the manner in which it can be exercised despite canner objection, perhaps you will agree that to seek antitrust immunity in this fashion would be worse than jumping from the frying pan into the fire.

For it has repeatedly been made clear beyond challenge that the marketing control schemes that can be comprehended in these orders go far beyond raw material. The control Order can limit not only the amount, size, and grade of raw material to be allocated to—that is, that can be purchased by—the individual canner. The Order can also control the quantity that he may pack, where he may ship, the labeling of the product, the grading of the canned food, the inspection of the canning plant, and indeed forbid any marketing method which the Secretary of Agriculture may deem unfair.

On top of this, the cost of administering this comprehensive and complicated control scheme must be borne by the canners. The assessments never go through the public treasury, and cannot be judicially challenged. Violation of any provisions of the Order carries penal consequences.

The real vice, however, is that under the Agricultural Marketing Act, these Orders may be imposed without the agreement of any canner. What may be done, when it ought to be done, and the administration of the control order are left entirely to the growers. In the finished product the canner has a far greater financial stake than the grower. Hence I suspect that when it refused to apply this system to canned foods Congress believed that a federal statute could never endow those not engaged in processing with complete wisdom as to how to control processing and marketing. At any event, Congress refused to authorize these control schemes, operating on canners alone without their consent yet at their cost, and that could be imposed even though the canners concerned might deem them impracticable, unwise, or downright destructive.

To answer the questions posed in the present discussion by seeking limited immunity under the antitrust laws through embracing this alternative might be likened to throwing out the baby with the bath. Equality of bargaining as to raw material is hardly preserved by surrendering to others control over the entire business operations. Freedom of enterprise cannot be fostered by substituting for it comprehensive and complete government controls.

To return to the narrow issue of combined grower activity on raw materials—the day may come when the loss of economic equality, particularly by the smaller canner operating only in one area, may lead to a change in Congressional climate and attitude. I hope that if and when this occurs it will not be a post mortem economic inquiry into parts of the canning industry. Many believe that if some presently discernible local trends continue, Congress will necessarily be asked directly to change the existing law. It is not uncommon for it to do so—when bargaining equality is lost—as the frequent comparison with the Taft-Hartley Act suggests.

Just what form statutory amendment might take—whether it would move in the direction of imposing further limitations in the Capper-Volstead Act or affording to canners comparable opportunity for combination—only time can tell. The renewed legislative proposals to transfer the authority now in the Act to control grower cooperatives from the Secretary of Agriculture to the Department of Justice may be both a symptom and a portent.

In the final analysis, however, many believe that this problem of combined grower activity is but part of the whole area of sound grower-canner relations. A statesman once observed that every part of a national tariff was in reality a narrow local issue. In a measure this is true of the present discussion in the sense of its primary focus on the individual canner in each community.

If it is, the primary need is not for legal comment, administrative or judicial proceedings, or new statutes. It is for better understanding of the community of interest that exists between the farmer who produces and the canner who adds a vast additional investment and contributes his processing skill and merchandising effort to the marketing of what is produced.

This is a large area, to some extent still unexplored, and in which I am hardly qualified as a guide. Yet I take the liberty of venturing three brief suggestions. The first is the constant need for local public education and understanding, which is simply an expansion of my earlier suggestion that the full facts ought always to be forthrightly presented to your growers and the community. The second is the importance of an experienced field staff educated in the art of getting the other fellow to understand a common problem. Both of these points have been splendidly spelled out by Mr. Countryman.

Lastly, and perhaps nearer the lawyer's work, much can be done in the way of making grower contracts more expressive of the community of interest which the two parties necessarily have. The 1949 Convention sessions on canner-grower relations—to which Mr. Countryman also referred—well warrant review on this point. As he emphasized, every grower contract ought to embody the essence of good canner-grower relations. It not only must be fair and reasonable; it must also be readable—in large type and plain English. For what the fieldman offers as the written basis for the season's dealing is the beginning point in making clear the community of interest that exists.

Caution is often considered the hallmark of the lawyer. When one is asked to delineate the line between the permissive and the penal, perhaps undue conservatism should be condoned. Particularly is this true when one can outline only the general pattern instead of advising on the specific problem.

If what I have suggested as legally permitted and pragmatically useful courses of action appear to be overly defensive, it is because I believe that the individual canner is both courageous and far-sighted, that he has learned that one season's difficulties often must be tolerated to ensure next year's success, and that no canner has ever hesitated to speak his mind and convictions. Above all, I remain convinced that growers are wise enough to distinguish between fair dealing with their processing buyers and even a legally sanctioned economic will-o'-the-wisp—that can lose in a bog of control both their own independence and the business security of grower and canner alike.

Austern Addresses N. Y. Bar on Robinson-Patman Act

H. T. Austern, Chief Counsel of the N.C.A., made observations on the Robinson-Patman Act in an address before the fifth annual meeting of the Section on Antitrust Law of the New York State Bar Association on February 19, just before the opening of the Canners Convention.

Salient portions of Mr. Austern's address will be reproduced in a forthcoming issue of the INFORMATION LETTER.

IMPROVING EFFICIENCY OF PRODUCTION AND DISTRIBUTION

Detectors and Correctors in Management Control

By Carl Clewlow,
Industrial Specialist Advisor,
Office of the Quartermaster
General, U. S. Army

Would you content yourself with an annual net profit of 2 percent in your business? This is a basic question in entering into a discussion of management controls, and their application to the canning industry, because in 1949 that was the average net income for the entire industry.

Discussing the subject of "Management Controls" is a bit like trying to decide just where to get on a moving merry-go-round. There are many places that one can jump into the subject. This is particularly true because there are so many misconceptions as to just what "Management Controls" are. Naturally, that gives rise to the question, "What do we mean by management controls?"

This question has been asked in just such fashion to many business men, with varied and surprising answers. Most all of them harbor the *hope* rather than the *belief* that management controls will provide them with the answers to management problems. To put it bluntly, that is just wishful thinking.

Management controls, in many senses, are both the orphans and the "Topsies" of modern day business. On the one hand, they are woefully neglected, and on the other hand, if they grow and attain some useful purposes, it frequently is in spite of and not because of the attention that they receive. To attempt to stand here and describe inclusively all possible management controls is an impossible task. To give a brief appreciation of what some of them are, and how they can work for you, is a little less difficult.

What, then, are management controls? Basically, management controls are the eyes and ears of management; they are the techniques and devices that tell what job is being done and how well that job is being done. These management controls begin as *facts* which become the bases for decisions. They are not the answers to the problems.

All too frequently, there is the desire on the part of management to have controls which will both point up the problem, and give an answer to the problem. Controls of this nature are usually administrative in character, rather than operational. As an example, if you notice that you have a problem of chronic tardiness in your organization, but your timekeeping is done without benefit of any mechanical control devices, you must decide how to treat that problem. If, however, you install time cards and a punch-clock system, your time cards do two things:

(1) Provide a measure of the problem.

(2) When translated into payrolls, having made the necessary allowances for the tardiness, provide a measure of remedy to the problem.

While in a small way, this is a type of management control, it may more properly be classed as an administrative control. Operating management controls, by way of contrast, leave more to the initiative, ability and capacity of the executive exercising the controls. It is this ability and capacity that marks the difference between the administrator and the executive. Another major trade association in the United States has been doing some research in this field, and has come up with an understanding that its members so far have found to be quite acceptable—

> The beginning or take-off point in management controls are those facts which provide a continuing basis for executive decision in the administration, analysis, development and planning functions of a business.

Personally, I like to think of management controls in a little different light. I remember my first airplane ride. It was in an old World War I vintage Jenny, in which the pilot literally flew "by the seat of his pants." He had nothing more to go on than a turn and bank indicator, an oil pressure gauge, a gasoline gauge, and a compass which worked part of the time. These were his management controls. They told him what was happening, to the extent that they could tell him anything. The difference between a good flyer and a poor one was the interpretation of these instruments and his resultant actions or decisions. Just as in the case of the airplane, and its instrument panel, management controls for our businesses today are the instrument panel of business.

Unfortunately, too many businesses are still run by the "seat of the pants" technique. Just as in our modern airplane, the panel has become infinitely more complicated, so has the instrument panel of business become more complicated. Problems of cost, government controls, taxes in new forms, price floors as well as price ceilings—all these and other factors call for newer and more management controls to meet the situations. The question then is: What has each canner done to improve the facts essential to his understanding of the business, which to him are the basis for the operational management controls of that business? Management controls are made up of the two parts previously identified—the detectors and the correctors.

Let's switch a moment to the subject of "Detectors and Correctors in Management Control." We recognized a few minutes ago that management controls are the eyes and ears of business. What are our eyes and ears? They are for us a sort of detector; they detect certain things that are happening around us. Fortunately, we are all endowed by nature with certain kinds of detectors; some of us use them more than others, but that is a matter of judgment.

In business, too, we have detectors. There are cost accounting systems, which detect either on a day-to-day, week-to-week, or some other basis the amounts of money being spent in certain areas of cost. Properly used, these are detectors. There are systems for work measurement, which pass back along to the manager the expenditure of time in man-hours in various work areas, or work projects. These, too, are detectors. A concentrated effort would elicit countless detectors that each of us has at his immediate disposal. Doubtless, each company has many facts currently available which could be used in this manner, but which, for one reason or another, have not been so used. Counters on your processing machines, inventory counts, container counts, certain tax data—the detectors already in existence are many.

Recently, Dr. Stier of your own Association worked out a set of specific factors which a canner might consider for measurement in his management control system. These factors produce raw data, which is one of the kinds of data turned up in a system of management controls, and include:

(1) Raw Product
- Costs
- Quality
- Case Yields

(2) Processing
- Costs
- Production Efficiency
- Quality
- Equipment Productivity

(3) Warehousing and Shipping
- Costs
- Labor Productivity
- Equipment Productivity

(4) Selling
- Costs
- Sales Pattern
- Sales Territories
- Company-Industry Comparisons
- Quality-Price Relationships

(5) Research and Development
Engineering
Research
Analytical Work (Laboratory)
Experimental Design

(6) Financial Controls
Sales Ratios
Capital Ratios
Inventory Ratios
Profit Ratios

(7) Administrative and General
Purchasing Practices
Clerical Work
Personnel Evaluation and Selection
Work Injuries
Waste Disposal

In the final analysis, one canner may have all this information and still not have good management control. There may be several reasons for this. One may be that the data are being received too late; another may be that of employee reluctance to be guided by the data; but more than likely the fault will be in poor interpretation of the data. In other words, the detectors have produced the data, but management doesn't know how to interpret the data, or to make decisions based on the data which will produce the desired results.

Just as an example of what we mean by improper interpretation of data, let us take five average drivers who may be in this audience. If you were to notice the ammeter of your automobile showing a discharge, what would you do? This question was asked of a number of business men recently, and four out of five responded immediately "have the battery checked." The fifth one—the right one—said, "Have the ignition system or the generator checked." Here is a case where all five of them were familiar with the "detector" but only one knew how to interpret it. That is one of the problems of management controls. The data are developed, but improperly interpreted.

To illustrate further this point, let us suppose that you are developing certain personnel figures as a basis for one kind of management control. In the process, you notice that there is a high rate of labor turnover. What is the problem? It may vary— from a social problem, a personnel problem, a public relations problem, or even a policy problem. Your detector points out the problem area, and effective management corrects the problem. It is the proper balance in combining the two—detector and corrector—that makes for effective management control.

Winston W. Marsh, executive secretary of the National Association of Independent Tire Dealers, has worked on this problem for his own association, and has come up with the following conclusions:

"Management controls must give warning of obstacles which lie ahead and map plans to avoid them. Mapping plans connotes the ability to know in what direction to seek out the problem."

Also, control must examine the past and the current activities to seek out the weaknesses which can be eliminated and ascertain the results of planning.

Planning determines what *should* take place.

Control determines what *did* and *is* taking place.

The effective melding of planning and control—as what is planned to happen melds into what has happened —is the heart of management control.

In order for management controls to be effective, this melding of planning and control should encompass five principal things:

CARL CLEWLOW

(1) It must establish a reasonable standard of quality.

(2) It must find the best balance between quantity and quality of work output.

(3) It must establish a reasonably complete set of indicators or detectors which will leave no gaping weaknesses in the executive measurement of the company's operations.

(4) It must develop a successful measurement technique which does not place an undue dependence on personal opinions.

(5) It must provide the means of acquainting subordinates with a full realization of their responsibilities and the basic reasons for those requirements.

There are other detectors in the canning business, which have not been mentioned in the preceding list of categories. Those detectors are the various financial and other ratios that can be used. For example, there is a rule-of-thumb guide that is used in the canning industry that says: "Current debt in most business firms is considered to be out of hand when it becomes greater than two-thirds of the tangible net worth for the small firm, and when it becomes greater than three-fourths for the large firm."

There is another rule-of-thumb that applies to inventories. It employs about the same ratio, in that small company inventories should be watched carefully when they are greater than two-thirds of the working capital; and greater than three-fourths for the larger company.

These are *detectors*. The *correctors* come from the management ability of the personnel guiding the operations of the company, thus completing the cycle of management controls.

What then are some of the correctors that can be used in the application of management controls? Local ground-rules, as well as local conditions, will be a large governing factor, but there are some which will have fairly wide-spread application.

As an example, if there is a continuously low cash position, there may be several reasons: collections may be slow, the business may be done on a consignment basis, inventories may be just a shade too high, or there may be the need for more permanent capital in the organization. Doubtless there are many more possibilities and combinations of possibilities. This is cited because in the minds of most business men, the first thought to enter their minds is that there may be the need for more capital. Actually, in many cases, this is the last logical resort to correct the situation. The corrector, therefore, is a matter of judgment, and the condition can only be brought to light by the detector—not corrected by them.

Daily costs may be recorded—they are detectors—the resultant action to reduce, modify or otherwise correct inequitable costs is the corrector section of this puzzle.

You may well ask, "Why do you think that canners can use management controls? Why do they need them?" A very cold appraisal of data from the Bureau of Internal Revenue can do more to answer that question than anything else you may call to mind. What is your reaction to an industry that has a total net profit of 2.2 percent on its capital investment? This is something less than the yield of government bonds, which are known to be low interest-bearing investments. Or, what is your answer to the knowledge that during the last 15 years, with the exception of the war years, there have been from 40 to 50 percent returns each year from

canners in which there is no net profit. During the war years, only 20 to 25 percent showed no net profit. Does this strike you as an opportunity to introduce management controls?

This is not to imply that any one should go out and engage the services of a full-time advisor, or enter into long-range contracts with management engineering firms. Rather, it is to say that there is evidently a possibility of identifying certain operations within every organization that will bear watching. They will present possibilities of identifying trends. These trends mean something in the business. They are the guideposts. They can point the way to ineffective operations, as well as effective operations, thus pointing out the areas in which improvements can be made.

I would like to suggest one simple way of deciding if and what management controls are needed in your own business. Imagine that you have taken a month off for a South American cruise, out of the reach of your telephone, away from the many persons who can come in to see you at a moment's notice. Now you have returned, and are interested in seeing what has occurred. What are the first things that you would ask about your business? What would you want to know to bring you up to date? The simple answers to these simple questions give you the first start toward the development of management controls that will be useful to you in your business.

There is an inevitable end result—more profits for the canner and better prices for the consumer. These can be achieved with the prudent use of "Detectors and Correctors in Management Controls."

Operations Research and Management Control

By Alfred N. Watson
Arthur D. Little, Inc.

The subject of operations research or operations analysis is quite new. Only in the past two or three years has it been reasonably available for application to business problems. Before that most of its methods were buried in classified military reports. Now, however, a sufficient number of applications has been made to demonstrate that its value as a management and profit control tool is greater than was at first suspected. Some of the byproducts of operations research have been increased efficiency in the factory, in the sales office and in the distribution system. While increased efficiency in individual departments is an important byproduct, the *main* goal of operations research is to provide management with a better means of analyzing and directing all company operations toward whatever goals management wishes to strive for.

Operations research starts as a thought process, a kind of systematic approach to problems. This systematic process parallels the way a scientist sets up a plan for attacking a difficult problem in chemistry, in physics, in meteorology, or in biology. For this reason it is not difficult to see why most of the application of operations research to business problems to date has been made by persons trained in the sciences and mathematics.

Now let me correct any impression that I am suggesting that you hire a botanist to head up your industrial relations work, or a geologist to serve as treasurer, or a mathematician to be sales manager. You and I both know the results of such a misinterpretation of operations research.

What I am really suggesting can be illustrated by analogy to Lindbergh's flight to Paris in 1927. It is true that he had some instruments, but skill and daring certainly played a major part in the success of that flight. Today, hundreds of pilots are able to repeat that performance with ordinary skill and little or no daring.

Now what brought about this change? A few scientists developed better planes, better instruments, better weather forecasting and put them together into a flight plan. By following a flight plan, the pilot, the flight engineer, the meteorologist and the tower control man work as a team. And as a team of ordinarily intelligent human beings, they accomplish results that would have classed them as geniuses only a few short years ago.

Now every business has a pilot, usually called the president. Let us consider for a moment those companies where the growth from a basement operation to factories with many employees has been accomplished in the working lifetime of the founder. The signs of the business genius of this pilot are apparent everywhere. Every time he makes a major move or policy change the company is likely to benefit. A business Lindbergh is obviously in the pilot's seat.

The real question comes when the guiding hand of genius is no longer at the helm. No one has yet devised a way to pass superior judgment, pleasing personality, and a feel of the market on to successors who must some time make the decisions.

Just as every business has a pilot, it also needs a flight plan. As we have seen, flight plans permit a group of ordinary men to work together as a team and thereby to follow reasonably well in the footsteps of genius.

The flight plan approach is habitually used in science. It is routinely taught to all scientists. It has been learned and applied by literally millions of persons. Surely, it can't be too complex and too difficult to learn, or all those people wouldn't have acquired a working knowledge of it. This flight plan is sometimes called the "scientific method." I think we will all agree that the advances currently being turned in on a wide front by scientists in the fields of atomic energy, electronics and medical research alone indicate the power of the scientific method to produce results in those areas.

Operations research was conceived by scientists as an application of scientific method—the construction of a flight plan if you will—for use in solving management problems. It was used first in military management work and is now being used in business. It is no surprise, then, to find scientists suggesting methods of attacking the solution to problems without in any way suggesting that they, the scientists themselves, are best qualified to carry out the plan. We would all prefer to take off with Lindbergh flying even without instruments than to take our chances with a flight engineer with a plane full of instruments who had never flown before—or in business terms—who had not met a payroll before.

What is this scientific method—this flight plan that so many can learn to apply with such good results? Is it a set formula that can be written down and memorized? Or even a fixed pattern that can be applied to any type of business under any conditions? I won't take the time of this group even to deny such ideas. On the other hand, is it a nebulous thing that you can't put your finger on; or is it uninformative like the famous statement on how to make money in the stock market attributed to Baron Rothschild, "Buy sheep and sell deer." This time I will take a moment to confirm that operations research is definite, concrete and down-to-earth. As the name implies, it deals with actual operations, with the man at the bench, the salesman in the field, and with the ultimate consumer of your products. In short, it is a plan for establishing company goals and for seeing to it that every operation in the company systematically drives toward those goals.

By this time you are probably saying to yourself, "Sounds interesting, but let's be more concrete. How do you start to apply operations research methods?" All right, let's get started by reaching into the bag of tricks and pulling out one of the most useful ideas. Let me say it in one sentence, then illustrate it with a few examples. This is it. Many of the most complex scientific and business operations can

be described in relatively simple mathematical formulas.

Let me start first with the complex scientific operations and then get on with some business examples. One of the most baffling things in science is the way that offspring inherit certain characteristics from their parents. Small genes from each parent, too small to be seen in the microscope, somehow combine and a new person, plant, or animal is born. The obscure monk named Mendel didn't know anything about genes or about following the growth of embryonic plants step by step. He didn't need to do this. He simply observed that when pure breed tall plants were crossed with pure breed short plants, he obtained approximately three tall offspring for every one of the short variety. Here then was a very simple mathematical formula for a very complex genetic process.

There is another example of complexity reduced to very simple formulas. Before the time of Newton, great masses of data had been collected about the movement of stars and planets in the heavens. Out of this bewildering mass of information Newton conceived of one or two simple ideas about how large bodies attract each other. He said that the attraction became greater as the bodies were larger and attraction became smaller as they got farther apart. When he put these thoughts into relatively simple mathematical formulas, he expressed the law of gravitation. And even more astonishing was the fact that these millions of facts previously having no rhyme or reason fell into neat rows of meaning —each made sense. Again a single mathematical formula had expressed the real essence of a most complex operation.

Last month *Business Week* carried an article about a new machine that could test the road performance of an axle on a motor vehicle. The unusual fact was that the axle never left the testing laboratory. By means of hundreds of actual road tests a few factors had been found to control axle performance. Only a few of the many stresses and strains on the axle were really important. By expressing these in a formula and making a machine to show the results of varying the critical factors, tests even beyond those encountered on the road could be made. Here again, an extremely complex situation had been shown to have certain patterns of behavior relating to a relatively few factors, all of which could be expressed in a formula.

Examples could be multiplied. Darwin's theory of evolution is really a simple way of accounting for his countless observations on plant and animal species. On the medical front scientists struggle to find the one or two really critical factors controlling cancer and polio—factors which will make sense and bring order to the millions of facts and observations that have been made about these apparently indiscriminate killers.

Now what do all these examples suggest? I think they fairly suggest that some highly complex operations often tend to fall into a pattern. One of the secrets of success of operations research is first to discover such a pattern, then from a mass of data isolate those factors which really control the situation. From this point management takes over, but management now needs to worry about a relatively few control factors. It can concentrate and be more effective when it has to deal with only a limited number of such factors.

Before we turn to the example of applications of operations research to business, let me emphasize that not all human behavior has been reduced to relatively simple patterns. There is one activity upon which literally millions of good minds have concentrated for more than a hundred years and still seem unable to bring a pattern out of the thousands of facts that are daily piled upon literally billions already reposing in dusty files. I refer, of course, to the stock market, that unbelievable complex of human emotion and logic.

ALFRED N. WATSON

Apparently then, this scientific method of approaching problems is a powerful tool for analyzing *many* problems but it is not the answer to *all* problems. Our experience to date indicates that certain types of business problems will yield to this method; others have not yet given up their secrets.

Right at the start I said that operations research is a thought process—a systematic gathering and analysis of data. Let's see how that thought process starts to work on a business problem.

The first question to ask is, "What is my company goal?" What is the yardstick by which we measure total company progress? Is it total sales? Is it gross margin of profit? Profit after taxes? Turnover? Return on investment? As you listen to these words can you formulate explicitly what your company goal is? Look out, if you say, "We have several company goals." If you want to push product A, if you want to hold 10 percent of the market for product B, if you want to maximize return on investment and if you want to increase total dollars of profit—if you are striving to reach all of these goals at the same time in the same company —it should be a warning. Inconsistent and multiple company goals lead to executive friction, indecision, uncertainty and reduced efficiency.

I would like to recall to you a method of selecting a company goal that you may have seen before, but I hope that this time you will consider it in the light of my remarks about operations research. Figure I has been selected by duPont, Monsanto Chemical, Armstrong Cork and a number of other companies in widely different fields as a really simple formula for expressing complex company operations.

Note here a single company goal on the left hand side called, "Return on Investment." Return on investment is broken into two main factors—turnover and margin. For example, if your turnover is twice per year and your average margin is 15 percent, then your return on investment will be 30 percent per year before taxes. As we proceed further toward the right, we note that turnover itself can be expressed as sales divided by total investment. Lower on the chart, margin is shown as earnings divided by sales. Finally, we note a more detailed breakdown of investment into permanent plant and fixtures and working capital consisting of inventory accounts receivable and cash. Down below earnings have been further analyzed into sales less cost of sales. Finally cost of sales springs from mill costs, selling costs, delivery expense and administrative expense.

Here then is one approach to the application of operations research to a company's operations. All of the operations of major importance have been tied together into a relatively simple formula. This formula expresses each process in the company in terms of its effect on the company's one goal, i.e. on return on investment. Now note particularly if you will the box called mill cost. This is a box

FIGURE I

Relationship of Factors Affecting Return on Investment

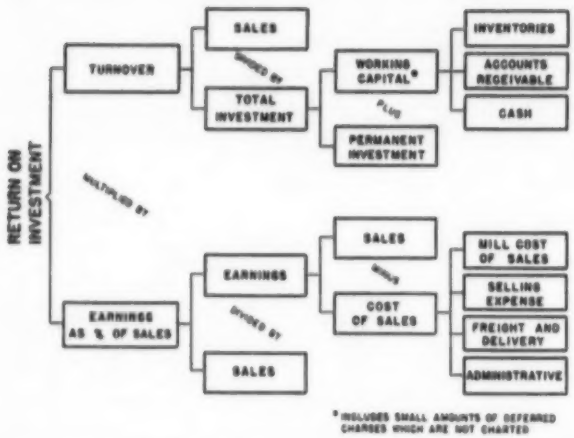
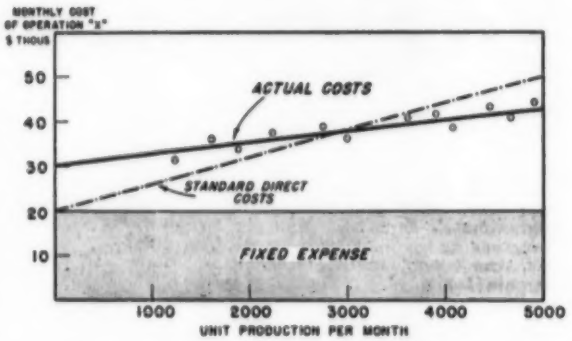


FIGURE II

A Clue to Problems in Scheduling, Budgeting, and Finance



we want to analyze in more detail. In Figure II there is an analysis of a single operation out in the factory. It is the type of chart that you probably have had made or has been called to your attention by your financial officer. It really tells quite a story. Across the bottom are the words, "number of units produced." This is monthly production. Up the side is the *cost* of producing the units each month.

There is an area near the bottom of the chart marked, "fixed expense." This was the foreman's time and the part-time cost of a secretary; this cost is the same each month regardless of the number of units produced.

This slanting dotted line came about in the following way. A series of studies was made and the average variable time cost per unit was determined. A slanting dotted line was then drawn starting at the fixed expense line on the left side of this chart as cost for zero production. This then was called the variable expense line, representing the total variable cost per month as production increased.

The only difficulty was that the actual expenses didn't behave in this fashion—and for a good reason. The machine could process four units of work at one time. Over a large number of studies the average number put through was three. However, when schedules were interrupted or production was low, the operator frequently saw men idle waiting for his machine to turn out the work. Even though he had only one or two units available to put through, he did so. He used his head to keep the others from being held up. When production was high and he had a backlog of work, he always put four units through the machine. The result was the actual expense lines shown on this chart.

The increased unit cost of poor scheduling or low production is apparent in the difference between the solid and dotted lines on the left. To the company treasurer this means a fixed element of expense that needs to be added to the fixed expense already shown when calculations are made of company break-even points.

On the right side of the chart, however, there is good news for management. The difference between the dotted and solid lines here means that under full production and good scheduling, the cost per additional unit is lower than was suspected. This means that more money could be spent for sales activities to maintain high production because the unit cost of the extra units is much lower than was thought previously. It also means that the man in charge of this operation needs a new flexible budget consistent with operating facts. Using the dotted line as a budget, he is hopelessly lost in times of low production. During high production he will look good in spite of low efficiency. Even though based on a series of time studies, the dotted line is not the correct way to construct a yardstick of this foreman's performance.

This simple chart has told us quite a lot! It suggested a study of scheduling; it showed break-even points in a new light; it pointed up the need for a revised budgeting procedure, and finally suggested to management new profit opportunities from low cost additional sales.

Recall if you will that Mendel and Newton and the axle company were able to account for some very complex operations with a simple formula. I would like to suggest that this chart is but another example of the same idea—applied this time to business management.

Now, let's take an example from the selling end of the business. You will recall that this was also one of the boxes on the right hand side of the return-on-investment chart.

In Figure III a sales commission schedule from real life has been disguised for reasons of industrial security. But the story it tells still remains.

This is a two-way sales compensation schedule. A salesman is judged both by the total number of units of product A that he sells, and also by the total dollar volume he achieves in the complete line of products. Product A is made by the company in its own factories. Other items in the line are distributed for other manufacturers.

For example, if he sells between 2,000 and 3,000 units of product A and less than $10,000 of the total line, his commission will be $500. However, he can make the same $500 commission by selling less than 2,000 units of product A if he steps up the volume of sales of the total line to over $10,000. In fact, this chart shows that there are three ways he can get $500 commission, and he will select, of course, the way that is easiest for him. But what are we doing to the company as a whole with a sales commission schedule like this? Chances are that the manufacturing department was not consulted, yet if the salesmen choose to gain their commission by pushing the entire line, our own factory which produces only product A may have to reduce production down into the high unit-cost areas shown in the last slide.

It also happens that the other fellow's lines we distribute are usually sold on time. Our salesman then has the power to determine the amount of cash we have tied up in receivables as well as our average unit cost in

FIGURE III

Sales Compensation—Finance

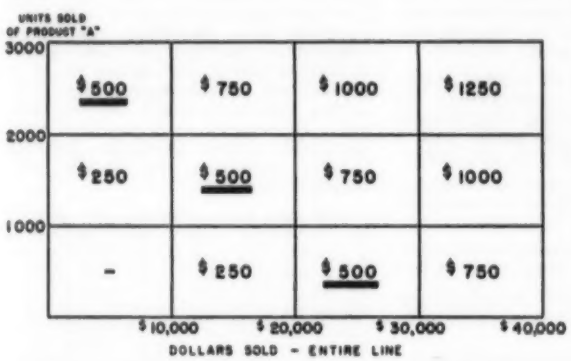
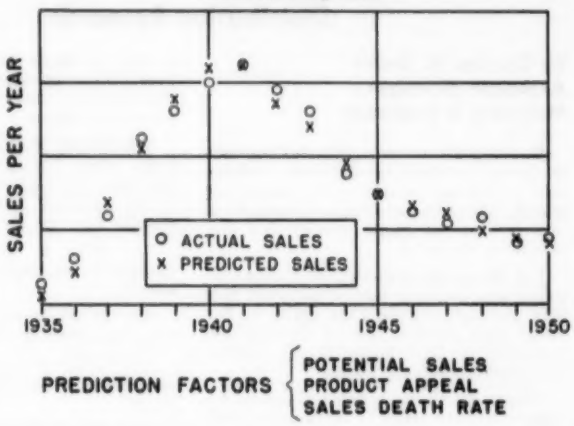


FIGURE IV

Factors Affecting Sales



the factory. The way he chooses to make his $500 of commission can substantially alter our return on investment picture. In this schedule the salesmen's incentive is the same, but the company's purpose may not be served equally well by each method.

In Figure IV it has been necessary to do a little more camouflaging for industrial security reasons. The products of this company were based upon research in the chemical field. Therefore they had a high rate of obsolescence. General consumer and professional advertising as well as personal calls were used to sell.

Sales increased very rapidly at first in this typical product, then declined as competition came in either from other producers or from new chemical developments.

A number of such products were studied and it was found that only three factors controlled the rate of sales for all practical purposes: (1) Potential sales or the estimated market, (2) the product appeal for which a measure was developed and (3) sales death rate caused by competition and obsolescence.

The interesting thing here is that the pattern was so typical that shortly after a product is introduced its sales future can be reasonably well predicted. I don't need to emphasize to this group the advantage of having such knowledge. I won't dwell on this further except to point out that Newton's law of gravitation may have had more world-shaking significance than the discovery of factors affecting sales in one company. However, resemblance as to method of attacking the problem and of simplifying the results I think you will agree is reasonably close. This is operations research.

Let us return to Figure I. Note again that in spite of apparent simplicity, some pretty complicated relationships are involved. Each sale incurs sales expense, adds to earnings, increases turnover, adds to accounts receivable, decreases unit costs, and perhaps adds to inventory requirements and reduction of cash. Some of these factors increase return on investment—others decrease it. Is it possible to find the right sales compensation schedule that will give the salesman maximum incentive to do those things which also maximize company rate of return? Is it possible to calculate how much may be spent for advertising and the time period over which a given advertising budget should be spent to increase rate of return as much as possible?

Is it possible to reconcile the conflicting interests of the production department that wants to level out production, with the treasurer's office that takes a dim view of money tied up in inventory and with the sales department that wants to be able to make immediate delivery on all items?

Is it possible to choose wisely between the sales manager who asks for an appropriation for a promotion campaign and the factory manager who asks for an equal amount to buy new machinery?

Is it possible to establish budgets so that a low-cost department is deliberately encouraged to incur overtime to prevent overtime in a high cost department?

The answer is "yes" to each of these questions. Operations research has been successfully applied to these areas. Whether it can be helpful in other areas remains to be seen. But I think you will agree that the odds are with it.

I started this discussion with the idea that operations research is a thought process—a systematic means of approaching solutions to complex problems. I suggested that ordinary persons skilled in the art of analyzing data and working with modern machines could often follow closely in the footsteps of genius working without such aids. I also emphasized that these are *aids* to management rather than management itself, which in my book still remains as much of an art as a science.

I believe that a new tool has been made available to aid management in directing the flow of capital, in sales planning, in holding down costs and in sleeping better at night.

Not much has been written on operations research as yet, but articles are beginning to appear and several universities are now offering courses in the subject. I have noted several of the articles in a recent paper published by the American Management Association in New York called "Operations Research and Financial Planning." On the subject of an analysis of company goals I would say that the article by Charles C. James called "The Basis of the Flexible and the Variable Budget in an Expanding Economy" in the September, 1952, issue of *Advanced Management* published by the Society for the Advancement of Management is valuable. And I would be glad to suggest additional material if any of you are interested in pursuing the subject.

It has been a real pleasure to be here and to take even a small part in one of the largest conventions of its kind. I feel almost as I did when I was discussing my trip here with a biochemist friend of mine. He said, "You know that without the canning industry the growth of our metropolitan areas would have been practically impossible." It was a new thought to me, but the more I pondered over it, the more I realized the importance of canning to our whole economic structure. If today through a brief description of operations research I have been able even to suggest methods of increasing the profits and efficiency of such an important contributor to our way of life, I shall feel amply repaid.

Increasing Selling Effectiveness through Distribution Research

By Charles W. Smith,
Associate Manager,
McKinsey & Company

Barring all-out war, the next decade is likely to offer tremendous volume and profit opportunities to companies whose executives are both sales-minded and willing to spend money for distribution research.

For the great majority of companies today are wasting potential profit dollars simply because they have so far made only limited use of distribution research to find ways of increasing their selling effectiveness.

Where do these opportunities to increase profits exist? Wherever any of the following conditions are to be found:

(1) *Excessive investment in inventories* that could be reduced through more accurate forecasting of customer requirements and better planning of production and inventory requirements.

(2) *Too-high warehousing and transportation costs* that could be reduced by relocating warehouses or improving methods of packing, packaging, handling, stocking, and delivery.

(3) *Oversolicitation of low volume, low potential customers or trade outlets or undersolicitation of high volume, high potential accounts or prospects* that could be eliminated through better training, direction, and supervision of salesmen.

(4) *Too complicated paperwork procedures for handling orders, billing accounts, and controlling inventories and selling expense* that could be simplified or eliminated by closer integration of sales department procedures with other company procedures.

(5) *Underdeveloped markets in which sales are being lost to competition* that could be better exploited if local advertising, sales solicitation, pricing, and customer service policies were geared more closely to individual market requirements.

(6) *Uneconomic or spotty distribution of important company products* that could be corrected by revision of company distribution policies and by carefully directed effort to achieve stronger point-of-sale distribution in every key market area.

(7) *Inclusion in the product line of too many low volume, low potential products that raise average production costs, increase and complicate inventories, and divert selling effort from high potential, high volume items* that can be corrected by careful pruning of the product line and the establishment of procedures for controlling future additions of new products.

Any of these conditions, when they exist, offer an opportunity to increase distribution efficiency and thereby enhance a company's profit position.

This brief listing of typical symptoms that indicate opportunities to increase over-all selling effectiveness leads logically into the points that I should like to cover with you today.

(1) Why is distribution research becoming so important to management?

(2) What is the scope of distribution research as a field of activity?

(3) What is involved in organizing an effective distribution research program?

(4) How can the value of such a research program be measured?

Why is Distribution Research Becoming More Important to Top Management?

The day is rapidly passing when a company can grow in size and make a satisfactory profit merely by offering a competitive product for sale. To continue to grow and be profitable under today's increasingly competitive market conditions, a company must be an efficient distributor as well as an efficient producer.

Achieving more efficient distribution, however, does not necessarily mean that a company should spend fewer dollars for distribution. For to broaden the market for a given product, for example, may actually require that a company spend more money rather than less for salesmen, advertising, warehouses, showrooms, etc. Neither is efficient distribution merely a matter of the physical handling or movement of goods.

To achieve fully efficient distribution, a company must take into consideration all of the factors involved in moving its goods from the end of a production line to the ultimate consumer. A list of these factors includes—in addition to physical handling and transportation—the financing, insuring, buying, merchandising, selling, and advertising activities that must be performed. Seen in this light, the task of increasing over-all selling effectiveness—that is, achieving more efficient distribution—is one of the most critical problems facing every company today.

The importance of the problem is evidenced by the fact that the largest and most profitable companies in every industry typically are the most efficient distributors. If you question that statement, simply make a mental list of the companies that you consider to be outstanding. What is the one factor that distinguishes a great majority of them? It is not production skills, for in every industry there are one or two companies that produce with technical skill equal to or better than the acknowledged leader. Actually, it is the ability that these leaders have demonstrated to sell their products more effectively than their competitors that has put them on top. A further look at the reasons for their success will usually disclose that their selling effectiveness did not just happen. In most cases it has been built up slowly—often painfully—through careful attention to details and through research.

The role that research has played in increasing selling effectiveness of a number of these leading companies is a matter of record. Alfred P. Sloan, Jr., long-time head of General Motors, stated as long ago as 1941 that "Research into the problem of distribution has paid General Motors big dividends."[1] Frank M. Surface of the Standard Oil Company of New Jersey related in some detail the substantial improvements made by his company in the distribution of its products as the result of an exhaustive study of the costs involved in distributing them.[2] In the food industry, of which your group is such an important part, there are many examples of the value of distribution research in enabling individual companies to cut distribution costs.

In spite of the success that some companies have had in increasing their selling effectiveness through distribution research, it is a fact that most companies, including some of the largest and best managed enterprises, have not yet begun to capitalize on more than a small percentage of their opportunities to increase their over-all selling effectiveness through the use of organized distribution research. If this is true, what are the reasons? In my opinion, it stems from the fact that these companies have not recognized clearly the scope of the field, or the basic organization problem involved in setting up a distribution research program.

What Distribution Research Means

Simply defined, research is merely "the orderly gathering of facts to solve problems in any field." The problems may be current or future problems. For as Charles Kettering once said so succinctly, "Research is figuring out what you will be doing when you are no longer able to do what you are doing today." Actually, distribution research must be concerned with both the present and the future. For unless

---

[1] Alfred P. Sloan, Jr., *The Adventures of a White Collar Man* (New York: Doubleday, Doran & Co., 1941) p. 140.

[2] See Frank M. Surface, *Distribution Costs—Key to Competitive Efficiency* (General Management Series No. 154, American Management Association, 1948).

such research anticipates future developments, its value is necessarily limited in a field in which the only thing constant is change.

What then *are* the problems to which distribution research can be applied? Nine ways of increasing distribution efficiency are suggested by the following basic problems that fall within the scope of the broad field of distribution research:

(1) Unnecessarily complicated product lines

(2) Faulty inventory planning and control

(3) Excessive warehousing and delivery expense

(4) Use of uneconomic or spotty distribution channels

(5) Unsound allocation of advertising promotion in terms of market potential

(6) Unnecessary order handling and invoicing paper work

(7) Inefficient materials handling methods

(8) Excessive packing and shipping expense

(9) Excessive sales solicitation expense.

With sufficient time, specific examples could be cited to illustrate the application of distribution research to every one of these basic distribution problems. The literature of the field, however, abounds with examples of the application of distribution research to specific problems.

Organizing a Distribution Research Program

For the purpose of this discussion, therefore, I am assuming that the companies represented in this audience fall into two broad categories:

(1) Those that have already taken steps to solve their distribution problems through organized research.

(2) Those that have yet to recognize the full extent of their opportunities to increase selling effectiveness through distribution research, or having done so may be concerned with the problem of how to organize an effective distribution research program.

In either case, what I wish to say about organizing a distribution research program should be of some interest; either as a basis for re-evaluating steps that have already been taken, or as a basis for considering steps that can be taken to increase distribution effectiveness.

I should like to address myself, therefore, to the following questions:

(1) With what activities and problems should distribution research be concerned?

(2) Who should have responsibility for conducting distribution research?

(3) How should the job of that individual be defined?

(4) Where should a distribution research program be started?

(5) Why is a working plan essential to success?

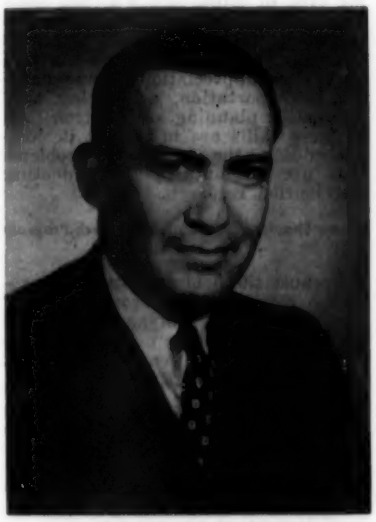
(6) How can the success of a distribution research program be measured?

The Scope of Distribution Research

Distribution research is basically concerned with finding more efficient ways of moving goods from the end of the production line to the ultimate consumer.

In the canning industry, for example, distribution activities include:

(1) Planning the product line to be offered for sale and determining the quantities of each item that should be produced.



CHARLES W. SMITH

(2) Developing and executing an advertising program to bring the line to the attention of buyers and consumers.

(3) Developing and maintaining a system of distribution for warehousing, shipping, financing, and selling.

(4) Obtaining and handling customer orders, establishing credit, and billing and collecting accounts.

Many problems can arise in carrying out these activities. For example, I cite the experience of a group of foreign canners who recently attempted to develop an efficient distribution system for their product in the United States. One of the primary problems of this group was planning and controlling inventories. To assure a constant supply of their product at the point of sale, they had to maintain excessively large inventories. The investment required, added to the expenses for advertising and promotion, brought about the failure of the enterprise. So even though the group had a superior product, they were unable to distribute it successfully.

Everyone in this audience, I am sure, can cite specific instances of excessive costs or lack of efficiency in performing any one of the above functions of distribution.

Assigning Responsibility for Distribution Research

The interrelationship of the various activities that must be performed in distributing any product creates certain problems in assigning responsibility for distribution research.

To cite a specific example, suppose that your company were to find that its warehousing costs were out of line with those of competition. An analysis of the causes of too-high costs might disclose any one or all of the following conditions in addition to poor warehousing methods or facilities:

(1) That the sales department is insisting upon faster deliveries than are actually required by the trade, thus making it necessary to maintain larger stocks in regional warehouses and thereby increasing total warehousing costs.

(2) That the cannery is not controlling production to avoid large overruns on certain items, thereby tying up warehouse space for storage of inventory that is not needed to meet customer requirements.

(3) That too many slow-moving items are being carried in stock, thereby increasing storage space requirements above normal.

In order to develop a sound solution to such a problem of excessive warehousing costs, the cooperation of both the sales department and the production department would be required, although direct responsibility for warehousing might fall within the scope of another line department's responsibilities. In the typical company, a problem such as this simply falls between the chairs.

To avoid this possibility, the responsibility for conducting distribution research should be assigned to an executive who can look at all phases of any problem. This means that such an executive, if he is to produce results, must have the authority, as well as the responsibility, for seeking out all the factors that bear on each distribution problem that he investigates, regardless of the assignment of line responsibility for the various activities involved.

Defining the Job of the Director of Distribution Research

To make it possible for such an individual to work effectively, it is vitally important that his job be prop-

erly defined. Such definition requires consideration of the following factors:

(1) Level at which the executive reports

(2) Definition of specific responsibilities

(3) Limitation on authority to implement recommendations.

Because the recommendations of the Director of Distribution Research often will involve changes in the policies and procedures of a number of different line operating departments to achieve a satisfactory solution, it is important that the individual assigned to this position report to the highest possible level of authority. This will insure that his recommendations need not be biased in favor of any one line operating department.

Secondly, the authority of the individual in the position should be clearly defined to provide him with free access to information anywhere in the company, provided the information has a bearing on a specific distribution problem. For example, a question of how to improve customer service may involve accounting and billing procedures, as well as transportation costs and order handling time. Unless the Director of Distribution Research is in a position to get the facts about accounting and billing procedures that relate to the problem of customer service, he will not have the whole answer to the problem when he finishes his study.

Finally, it is important to make clear to line executives that the Director of Distribution Research occupies a staff position, and therefore has no authority to implement his recommendations. It may also be helpful to restrict the size of his staff, and to insist that he rely upon the operating personnel in the line departments concerned for technical assistance on problems that directly concern their operations. This will avoid the creation of an expensive, unwieldy staff and will also avoid the conflicts that can arise so easily between staff and line personnel when the latter have reason to feel that the former are telling them how to run their jobs.

Needless to say, the individual in the position of Director of Distribution Research can produce results only if he receives the enthusiastic support of his top management. For I believe you will all agree that there is nothing that can breed so much resistance initially as a new way of approaching an old problem. "We've always done it that way" is a powerful argument in the hands of a line executive who has never been conditioned by his superiors to look at alternatives objectively before discarding them. Since it is the function of the Director of Distribution Research to suggest new ways of doing things that promise to pay off in greater over-all effectiveness, it is important that he be encouraged to exercise both imagination and good judgment in attacking specific problems. By reporting directly to the highest possible level of management, he is assured of an objective review of his findings and recommendations. He is also more likely to be exposed to the broad viewpoint of top management that sees the distribution function as an integration of many specialized, but closely related functions.

The individual selected to fill the position of Director of Distribution Research should preferably be an executive who is familiar with the problems of the company, and who has the confidence of as many of the line executives as possible. He must also be an individual who has an inquiring type of mind, and who has some knowledge of the basic techniques involved in fact-finding and analysis. Basically, he must know selling and have some appreciation of warehousing, transportation, accounting, and production planning and control. All of these skills are important in comprehending the types of problems that are encountered in conducting distribution research.

Where Should a Distribution Research Program Be Started?

Because the field of distribution research covers such a broad range of problems, many company executives hesitate to initiate a program of distribution research because they do not know where to start.

Actually, no company should have any problem in finding a good place to start a distribution research program. All that is involved is a preliminary survey of the situation to disclose the symptoms of distribution inefficiency that are most readily apparent. This can be done either on a judgment basis, or by the analysis of over-all distribution costs.

There is not an executive in this room, I feel confident, who does not know of certain inefficiencies in the distribution practices of his company. For example, one controller of a major food packer knew that his company's warehousing costs reflected high direct labor charges for materials handling. A question that he was thus able to raise led to a study of the possibilities for cost reduction through applying modern materials handling methods in his company's warehouses.

Another executive was concerned over the large amount of working capital tied up in inventory. His concern over this situation led to a study of his company's sales planning and control methods that eventually resulted in a substantial reduction in inventories and a major improvement in customer service through the virtual elimination of back orders—once a major recurring problem.

The executive vice president of another company was concerned over the fact that his company had no way of evaluating the contribution of each salesman to company profits. The result was a study of salesmen's activities that resulted in a substantial improvement in company selling operations.

Analysis of total distribution expenses is often helpful in raising questions that point to opportunities for productive distribution research. Such an analysis need not involve a detailed breakdown of costs. Rather, it should utilize already existing figures that show the relation of effort to results in the broadest possible categories. When major opportunities for increasing distribution effectiveness exist, such broadly based figures will provide significant clues to possible starting points for a distribution research program.

Developing a Working Plan

Experience of companies that have conducted successful distribution research programs suggests the importance of having a detailed working plan for every distribution research project. Such a plan not only helps to assure agreement on the basic objectives of the project, but also provides a basis for coordinating the activities of various participants in the study, and for reporting progress to top management.

Typically, a working plan for a distribution research project includes the following points:

(1) A clear statement of the basic objectives of the study

(2) A precise résumé of the major factors to be considered

(3) A listing of the basic steps to be taken

(4) An assignment of responsibility for each step

(5) A time schedule for completion of each step

(6) An estimate of the approximate cost involved in the study.

Obviously, it is extremely difficult to devise a plan that will require no revision during the course of the project. The possible need for revision, however, should not be cause for failing to plan a study in advance. For even if revisions are major, their significance in terms of time and cost can be much better appraised against a previous budget than if no plan exists.

Measuring the Success of a Distribution Research Program

Because of the many intangible factors involved in any distribution problem, it is often extremely difficult to measure precisely the results achieved through a distribution research program. One thing is cer-

tain, however, and that is that no results can be achieved unless action is taken on the recommendations resulting from a study.

Thus, it is vitally important for the Director of Distribution Research to keep always in mind the need for getting favorable action on his recommendations.

In some types of studies, particularly those that involve major changes in policies, facilities, or organization, it is important to defer action on preliminary findings until all the evidence is in and weighed. But in many types of studies, it is possible to see quickly opportunities for improvement that can be put into effect almost immediately. Every effort should be made to bring these opportunities to light as quickly as possible, not only to secure the benefits of corrective action without delay, but also to build confidence in the value of distribution research as a tool for increasing selling effectiveness.

An example of the application of distribution research to a food processing company follows:

PROBLEM:

To increase materials handling efficiency (as part of an over-all study of warehousing and distribution)

SPECIFIC ISSUES:

(1) What kind of warehouses should be used, where located, and how operated?

(2) What transportation methods should be used?

STEPS IN SOLUTION:

(1) Analyze steps in movement of goods to determine methods, equipment, costs and volume on a company-wide basis

(2) Develop new methods to achieve greater handling efficiency, optimum warehouse space utilization, and lowest transportation costs

BENEFITS:

(1) Direct materials handling labor costs reduced 40 percent

(2) Customer service improved

(3) Planned investment in additional warehouse facilities made unnecessary

Conclusion

Distribution research is still in the pioneering stage of development. The need for it is being recognized by more and more companies every day. Techniques for solving distribution research problems are constantly being improved. Further expansion of the field seems to depend almost solely upon the ability of executives to find a practical way of organizing and administering distribution research programs that will be as effective as those employed in production and engineering research.

Only time will tell whether distribution research can ever attain the stature of production research in this country. The executive who is seeking to make his company a leader in its field should make certain, however, that he has properly appraised the opportunities to increase selling effectiveness that can be achieved through organized distribution research.

Effective Use of Cost Accounting by Canners

By Frank C. Elliott,
Henry W. Peabody, Ltd.

Circumstances have kept me in the canned foods field most of my business life, from canning to marketing to buying. That experience has enabled me to make a close analysis—sometimes personally painful—of reasons for success or failure among canners. So it is from that background we are discussing this subject.

It seems a little strange in this modern age, and with all of the canning experience behind us, that there should be need even to discuss canning costs, but canners come and go—and the new ones usually have to learn by hard experience. It seems to be one of those facts of life that no generation learns from the previous one.

While today, among the majority of canning firms, there exists an acute

FRANK C. ELLIOTT

awareness of the necessity for adequate and efficient cost records, there does spring up around the country lesser firms which, for various reasons, do not keep or utilize proper cost data.

In the Pacific Northwest, before World War I, because the area was a garden spot for fruits, berries and vegetables, many canneries were coming into existence. In the light of today's technical knowledge the business was on a hit-or-miss basis. Uniform cost accounting procedure largely was unknown; the canner's mission in life was to wrap a tin can around something and hope that the product would stay in the can until he got it sold and shipped.

In some instances a canner's idea of costs worked about like this: He began the packing season with a given number of dollars in the bank. He canned his product and finally sold, shipped and collected for it. If there was more money in the bank than when he started, he calculated it a successful season. He may have made a very substantial profit on some items but, unknowingly, he probably took a financial beating on other items which served to nullify his earnings.

About that time there was one large canning firm operating several canneries, owned by Arthur Rupert. He possessed a somewhat better grasp of fundamental canning practices than some of his competitors. He had paid attention to detailed costs, itemwise, which finally resulted in the development of a cost sheet. On this form were listed, in their proper sequences, the various essential cost elements from raw fruit, through processing to shipping. He endeavored to classify direct and indirect expense, and to place each in its proper relationship. Those cost forms were simple affairs as compared with those used in today's modern canneries, but the basic idea was the same. Mr. Rupert, through analysis of his actual costs, gradually came to know, with some degree of certainty, how much money was involved in producing a case of a specified size and grade of canned fruit or vegetable. In selling, however, he found, in many instances that he was competing with what his costs told him were ruinous prices of his neighbor competitors. So he embarked upon a personal crusade—a tour of the various Northwest canners of that day—to try to educate them, first, on the need for reliable cost figures and secondly, a uniform procedure for developing them. I accompanied Mr. Rupert on that tour and was impressed not only with the general thirst for information by our competitors and their acceptance of his cost accounting technique but also with the fact that there were nearly as many ideas expressed of what constituted cost, as there were canners visited. As far as I know, that was one of the early attempts, in the Pacific Northwest, to develop cost procedures. Although unquestionably elementary, it paid dividends.

Some years later an Alaska salmon packer, operating several plants, was packing every species of salmon available, in all sizes and grades. Despite his volume, he was not showing much profit. Finally he installed a uniform cost system in his plants, borrowed partly from the fruit canning industry, which enabled him to determine, factually, the cost of each size and tin by grade and species. He was surprised to learn that one certain

species of fish not only was profitless but was creating a substantial loss. He eliminated that item, to the benefit of his bank balance. At the same time, the cost data disclosed serious wastage of expensive raw fish, and he was enabled to correct that condition, too.

Another incident comes to mind which indicates the necessity for accurate cost accounting. The No. 1 Tall salmon size tin was just being adopted by the Northwest fruit and vegetable canning industry a good many years ago. Our general superintendent prepared what appeared to be an excellent cost for various and sundry fruits and vegetables packed in the No. 1 Tall tin. Selling prices, based upon those costs, appeared attractive and resulted in a lot of business. At the conclusion of the packing season it appeared that something was wrong. The operation had shown no profit and, in checking back on the factory superintendent's rule-of-thumb cost procedure, it was found that he had overlooked the cost of the tin cans. While that obviously was a foolish mistake, nevertheless it could not conceivably have happened had the superintendent filled in a proper cost accounting form.

These horrible examples, which probably represented extreme cases, nevertheless are factual and are cited simply to indicate the necessity for proper cost accounting. Today the canning business is far more complicated than simply purchasing some raw materials, wrapping tin cans around it and selling it. Competition is forcing alert canners to pay more attention to their cost procedures. Also taxes, which, together with social security, compensation insurance, state and federal unemployment, are compelling canners to maintain better cost records. The maintenance and intelligent analysis of comprehensive cost records simply is another way of saying that a canner knows his business.

One of the important factors which enabled the chain stores to sweep over the nation some years ago at the expense of independent grocers was that, through analysis of their sales and costs, they learned which items were subject to rapid turnover and which were not, and which items were showing a profit and which were not. The plodding, independent corner grocer, not cost-conscious, and whose shelves and back rooms were filled with slow moving or dead merchandise, which froze his capital, was unable to cope with a fast-selling chain store in his vicinity. The success of one, and the failure of the other, resolved itself simply into knowledge, on the one hand, and lack of knowledge on the other, of the cost of doing business.

The canning industry, which, unfortunately, is not noted for overwhelming profits, must, of necessity, exercise more care in its cost calculations than an industry where the profits are so huge that errors in cost accounting are nullified. Factual cost data not only is important in arriving at adequate selling prices in relation to cost, but also in correcting faulty practices and eliminating unprofitable items or sizes, as did the chain stores. For example, salmon canners many years ago had to learn the hard, expensive way that it cost not 50 percent as much to produce a half-pound can of salmon as a one pound tall can, but 70 percent as much.

It is pretty obvious that if one is manufacturing window weights, it is possible to pre-determine quite accurately his cost of doing business. His raw material usually is available. There isn't much fluctuation in the cost during manufacture.

In the canning business—and this applies to fruits, vegetables, and fish—not only is there fluctuation in the cost of raw material right up to the time of canning in some years, but also, at times, during the actual canning season.

Even if there is no change in raw product cost, we always are confronted with possible changes in our raw tonnages. For example, a tomato canner may plan a 500,000-case pack, and estimate his costs accordingly. Suddenly midseason he is facing a crop shortage that will reduce his pack to 300,000 cases. His whole cost structure immediately is changed, because his overhead must be prorated over not 500,000 cases but 300,000 cases.

Only up-to-the-minute, accurate cost information will enable him safely to determine whether he will continue selling, or withdraw, or to advance his prices.

Careful daily analysis of the cannery's packing costs will instantly point up avoidable losses, or the break-even points, in utilization of raw tonnage, enabling prompt correction on the cannery floor. If a fruit canner's experience is that his fancy and choice grades are his good profit grades, and his standard grade the low profit item and the second and water grades are only his "thank you" or overhead absorbing grades, he needs to know daily if his raw tonnages are producing those yields or better. His end of the season analysis may be good historical reading, but will not correct mistakes during the packing season.

Among canners of a given commodity there are bound to be many variations in the over-all cost because of plant location, labor conditions, cost of raw material, etc. But a uniform method of arriving at costs enables a canner to know just where he stands individually. Someone recently made the very true statement that there is a vast difference between uniform costs and uniform methods of figuring costs.

Of course, if a group of canners of a given product were to attempt to develop a uniform cost, they would invite the scrutiny of the Department of Justice. But, on the other hand, certainly it is highly desirable, and to the benefit of the canning industry that there be developed a uniform *method* of figuring costs for that particular commodity.

It is feared that some canners, either by virtue of being new to the business, or because the boss is too busy with other matters, have given insufficient thought to the methods of developing costs. For example, as we are aware, placing an item into direct expense instead of in overhead expense can produce a very different final cost figure. It is pretty obvious that if an inexperienced canner sells his pack at a penny margin price through lack of proper knowledge of cost procedures, he will go broke ultimately. But in the process it also can be very painful to his competitors whose markets he disrupts.

I expect that nearly every canner in this room has at one time or another been plagued with that type of competitor. Two things can be done. First, you can let him go broke, and suffer while he is doing it. But in that event, he is succeeded by another inexperienced canner, and the cycle repeats itself. Secondly, one may endeavor to educate the canner and make a legitimate competitor of him. The district manager of a big, soulless corporation once told me that, while he had the power to crush the smaller competitors in his area, he preferred to work with them to the point that they became proficient, because competent, experienced competitors did not do the foolish things that cost all of the industry money.

An analysis of failures in the canning industry discloses that many are needless, due either to ignorance of costs or to inexpertly computing them, or to lack of ability to apply the knowledge.

One would like to believe, in this day and age of high prices, reasonable profits and ample consumer purchasing power, that we have reached the millennium—a sort of canner's Utopia. However, history warns that the hard law of economic average has a way of asserting itself, from time to time. So, it is not unreasonable—in fact, entirely reasonable—to expect that one day the reverse of present conditions will apply. What then of the canning industry? Who in that industry will survive? Will it be the canner who has taken advantage of these days, while all is well, to familiarize himself with proper cost acounting and learn every detail of his costs and put into practice intelligent econ-

omies? Or will it be the canner who, today, considers costs a sort of irksome byproduct of his operations?

Now, I have used many words to hammer the need for adequate cost accounting and why this method of financial control is essential to successful operation.

Some of you are familiar with a comparatively new movement, born of the need for more adequate cost data and a uniform method for computing it.

A number of canners have joined to obtain the benefits of a uniform method of figuring costs, and this has included the establishment of an efficient recordkeeping system. This has been accomplished through trustworthy accounting firms which analyze each canner's costs and point out to the group the operating shortcomings, without disclosing any individual canner's data.

Some of the clients of these firms sometimes are shocked by disclosures of excessive costs, particularly in handling direct labor and in utilizing raw material.

It is hoped that other groups of canners will see the value of similar movements within their respective competitive areas. The utilization of competent cost analysis, in my opinion, is just as important insurance-wise as is insurance upon plant and equipment.

ALFRED J. STOKELY

MILITARY PROCUREMENT

Government-Industry Cooperation on Canned Foods Procurement

**By Alfred J. Stokely,
Chairman, War Mobilization
Procurement Subcommittee,
National Canners Association**

The Association's War Mobilization Procurement Subcommittee during the past three years has assisted the Office of the Quartermaster General in the development of a sound and smoothly operating canned food procurement program. All of the officers and civilian employees, without exception, with whom we have worked have made us feel that our comments were welcome and valuable to them in their mission of supplying food to the armed forces. As I have observed it, the industry-government relationship has been and is of the highest caliber. It is, therefore, with pleasure that I call to order this Session on Military Procurement and present the Chiefs in the Office of the Quartermaster General who have the responsibility for developing and administering the program of feeding our fighting men.

The procurement program in effect last year, according to a survey made through the local associations last fall and recently through the request for questions from canners to be presented to the panel today, had the overwhelming support of the industry. All of us seem to appreciate that within the economy of the canning industry, the job of feeding efficiently and economically a military force of 3.5 million men, requires a wartime type of program. The requirements for No. 10 cans and for export casing make a wartime program essential. Likewise, it is desirable to maintain a broad geographical base of supply and to equitably spread the supply burden throughout the industry.

In maintaining a well organized program, especially when the program is founded on government and industry cooperation, it is essential that there be the fullest understanding of the abilities of each of the parties and their responsibilities to the program. The N.C.A. Procurement Committee has attempted, with the help of the local associations, to keep the Office of the Quartermaster General informed about the canning industry. Officials representing the Quartermaster General, in turn, many times have appeared on N.C.A. programs and the programs of state association meetings to tell the industry about the government's part in the program. Today's meeting was designed to further this exchange of knowledge in two ways: (1) by hearing from the panel members the whys and hows of canned food procurement and the limitations under which procurement officers operate, along with their expectations from the industry, and (2) through your questions about or comments on this subject.

Military Menu Planning

**By Col. J. S. Kujawski,
Chief, Food Service Division,
Office of the Quartermaster
General, U. S. Army**

When Genghis Khan and his hordes of tribesmen roamed at large more than 700 years ago, military menu planning was neither desirable nor essential. Under his concept of feeding of that day, the men "lived off the land" militarily speaking, called foraging. Even at the beginning of the 19th century, when Napoleon was developing new ideas on tactics and strategy in his endeavor to conquer Europe, his men, to a large extent, still foraged. Napoleon did, however, provide the seeds for menu planning when a prize of 12,000 francs was offered for the development of a new, successful means for preserving foods. The obscure Parisian confectioner, Appert, who entered the competition was awarded the prize in 1809, and the next year his treatise on canning appeared.

Since that time, your industry has innovated many techniques in cannery operations. Improved canned foods and a greater variety of them have enabled the military forces to feed the men better and to plan food operations soundly.

It was not, however, until after World War II that sound military menu planning was effected. Scientific management in the field of military menu planning—and for emphasis, I repeat the words "scientific management"—did not occur until the evolvement of the "Master Menu" and development of the "Annual Food Pattern." Inasmuch as the time available for discussion is limited, rather than discourse upon all types of operational rations, my discussion will be confined to referral to the "A"

ration and interrelationship with the Master Menu and the Annual Food Pattern. This can be readily accomplished since the foundation and principles which provide the framework for menu planning apply substantially to all military rations.

There are four basic features which control menu planning. These are cost, nutrition, acceptability, and availability of food items. First, with respect to cost, limited funds for feeding the armed forces are allocated by Congress. Under the stipulations imposed by Congress, Executive Order No. 5952, signed by President Hoover on 23 November 1932, embraces an allowance for 39 food components. These food components provide the monthly cost index which limits the amount the military may expend for daily feeding of the soldier. The job of the Menu Planning Branch, Food Service Division, Office of The Quartermaster General, has been to get the most for the money through scientific menu planning.

The next aspect, nutrition, has been a source of daily concern. A man not only needs a fine gun and military gear to make him an effective soldier, but he also requires an adequate amount of "food fuel" to keep him going. Proper nutrition is of the utmost importance in maintaining the health, efficiency, and morale of the troops. Gross deficiencies result in severe disease, but even mild nutritional deficiencies, not recognizable by gross symptoms, may cause lack of stamina, decreased efficiency, lessened physical fitness, diminished resistance to disease, and may delay recovery from wounds and illnesses. The basic standard of diet for the Army, and considered the minimum essential which will meet the requirements for health and the prevention of nutritional deficiency disease, consists of the following:

Calories	3600
Protein	100 gm
Calcium	700 mgm
Vitamin A	5000 I.U.
Thiamin	1.6 mgm
Riboflavin	2.2 mgm
Niacin	16 mgm
Vitamin C	50 mgm

Although one may prescribe a nutritional diet and make foods available that nutritionally meet these requirements, there is no guarantee the men will take these foods unless they are acceptable. I know the word "acceptable" particularly has been mentioned many times in the past. In order to provide a more substantive basis for research work, and also to aid in planning a more economical and acceptable Master Menu, food preference surveys were commenced in February, 1950, at posts, camps and stations throughout the United States having assigned strengths of 500 or more enlisted men. This survey was the first food acceptance study of this type to be carried out in the armed forces. It was also the first application of random sampling on food preference studies. Essentially, the survey was designed to secure information on the attitudes of enlisted men in the armed forces toward certain specified foods. Approximately 6,000 of these enlisted men, selected on a stratified random sampling basis, completed questionnaires.

The sampling plan consisted of three steps:

(1) Stratification of the Army installations into three groups according to assigned strength.

(2) Breakdown of the second group into two subgroups of equal size, each consisting of camps in all major geographical areas and various levels of physical activity, and selection of one of the two groups for inclusion in the study.

Col. J. S. KUJAWSKI

(3) Breakdown of the third group of camps into four subgroups of equal size, each consisting of camps in all major geographical areas and all various levels of physical activity and selection of one of the four groups for inclusion.

Thus, all larger installations, one-half of the medium-size installations, and one-quarter of the smaller are included in the sample.

In all, more than 400 food items pertaining to the Master Menu have been covered. We are still in the process of correlating and integrating the results of the survey into our menu planning activities.

After the cost, nutrition and acceptability aspects have been developed, the last, but certainly not the least, consideration is availability of the food items concerned. From the time of conception of the Master Menu in November, 1941, until October, 1948, the Menu was prepared on a month-to-month basis. Until 19 October 1948, paramount consideration in menu planning was not given to important factors such as:

(1) The extent of national production, particularly for canned and processed fruits and vegetables procured annually.

(2) The frequency of serving of the several items making up the Master Menu.

(3) The seasonality of production and the effect of seasonal use of commodities which have seasonal price variations.

Inadequate consideration of these factors in planning the menu on a month-to-month basis caused the following results to be obtained when an audit of 12 months' menu was made:

(1) Menu requirements demanded more of some items than could be reasonably procured. For example, a review of the 1948 menus on an annual basis indicated that over-all requirements of canned lima beans, berries and asparagus amounted to approximately 35 percent of total U. S. production for each item. Obviously, when procurement in these extensive quantities was undertaken, there was an inability to procure. As a result, other fruits and vegetables had to be procured as a substitute.

(2) The frequency of serving of certain items was too great on a monthly basis, when compared with best known acceptability data. For example, such items as canned spinach, canned carrots and canned beets were too frequently served on the menu, causing unnecessary waste.

Today, this situation does not exist for the Master Menu is based upon an Annual Food Pattern. The Annual Food Pattern is simply 12 combined monthly Master Menus, listing components, allowances and number of servings of a particular food item. Simple in operation, and applied 16 months prior to date of actual consumption, the Annual Food Pattern reviews national production data for perishables and nonperishables, incorporates results of food preference surveys, indicates frequency of use of foods and determines the quantity required to feed 1,000 men through the use of ration factors. A ration factor may be defined as the allowance, in terms of pounds, to feed 1,000 men for the year. It is the basis upon which food requirements for the Army are developed.

Since my colleagues in both procurement and distribution are to inform you more in detail of their procedures, I shall resist saying any more. Needless to say, these combinations, procurement and distribution of food items, cannot be undertaken without the helpful aid of the canning industry, and particularly the assurance that the food items will be available when needed in the quantities desired.

Requirements and Distribution of Nonperishable Subsistence

By Lt. Col. J. W. Maxwell, Chief, Subsistence Branch, Office of the Quartermaster General, U. S. Army

We have just discussed food service functions. I will discuss the requirements and distribution function, and related activities, which are the responsibility of the Subsistence Branch.

Reducing these elements to their simplest terms, the Food Service Division plans menus for Army and Air Force feeding in the U. S. It also reviews ration factors which oversea commands submit, for proper nutritional balance and adequacy. At the local installation, Food Service prepares and serves the food. The role of the Subsistence Branch, Distribution Division, is to determine requirements and insure that the local Food Service element always has enough of the right food components to prepare and serve and on time. We provide the Procurement Division with the procurement requirements on which contracts are made. After the Procurement Division has done its fine job and contractors deliver stocks to the Army, my Branch concerns itself with the distribution of stocks in proper proportion, to the depots, and through them to the Army post, camp, or station, and the Air Force base, or to oversea command.

Presenting these interrelated elements in a homely manner, the Food Service functions as the Army housewife. As such, she gets little or no credit, as long as the meals are up to a standard, but let that standard slip for just one day and we all know what happens in the home. Food Service has a sizable and thankless job in coping with the preferences and prejudices of more than a million individuals, reared in all parts of this land and already inhibited with environmental, inherited or religious taste preferences. The Army, as well as the housewife, must stay within a food budget. So she plans what to have, in what combinations, the quantity to be served per person, and when. With this planning completed, she calls her grocer, tells him what she wants and when she wants it delivered. In the Army the Subsistence Branch most nearly resembles the grocer. We take the requirements of all Army and Air Force housewives with their delivery schedules, and consolidate and present them to the Procurement Division. Procurement Division, through its field agencies and offices, contracts with you canners for quantities and deliveries.

When you deliver against a contract, the Subsistence Branch channels deliveries into the depots and controls distribution within the Army supply system, and from the depot to the station or air base commissary. In carrying out this function we become the grocer's delivery boy, but once the stocks are in the station or air base commissary, Food Service picks up, prepares, and serves it.

Now that you have a literal picture of the food service, supply and procurement functions, I will utilize the remaining time in a more detailed elaboration of Subsistence Branch responsibilities and related activities. Basically they are in five areas:

Lt. Col. J. W. MAXWELL

(1) To determine requirements that will insure enough and on time, but avoid overstocking;

(2) To distribute so as to eliminate cross hauls, back hauls, and yet have enough and on time at the right places;

(3) Budget for procurement needs, allot funds for procurement, and account for all appropriated funds expended;

(4) Technically supervise the operation of all Army commissaries and commissary stores; and

(5) Exercise staff supervision over the operation of the Market Center System which purchases perishables for the Army, Navy, Air Force, and Marine Corps.

I will concentrate on those areas in which you are most interested. Our first objective is to determine firm requirements on which to procure annual quantities necessary for consumption. We start with the ration factor, which is the daily average in pounds of an item required to feed 1,000 persons in a feeding group. There are many and varied feeding groups. The Master Menu (Army and Air Force) provides that factor for feeding the field ration in the U. S., but each oversea command prepares and submits a separate ration factor for each feeding group for which it is responsible. Each ration factor submitted is reviewed for the availability of items in proportion to the frequency of serving. Each is then reviewed as to nutritional adequacy and balance, following which it is approved with or without qualification. At this point you may be mentally debating the necessity for so wide a latitude in ration factors. Bear in mind that the appetites of our own military personnel are affected by the climate and degree of physical exertion involved in performing their duties throughout the world; we actually feed other than our own military in oversea occupied and combat areas; and wherever practicable we endeavor to utilize locally produced perishable items except meats to fullest advantage.

By applying this ration factor to the projected strength of the feeding group, and to the number of days in the consumption period, we arrive at a total requirement by item for that group. The total requirements of all groups give us the gross requirement for an item. From this we deduct all assets such as stocks on hand, due in, or on procurement. Comparison of requirements is then made to issue experience. In some instances where issues have run low on an item for several months, requirements are reduced accordingly.

There are two types of central nonperishable procurements—annual and quarterly. Quarterly items are those nonperishable foods produced and packed the year round. They are procured quarterly with deliveries scheduled monthly, to insure a minimum stockage level and a maximum turnover.

After all of the factors outlined above have been reconciled, the refined requirement becomes the procurement requirement and is entered on a "Procurement Request" along with other data such as the:

(1) *Applicable Specification*—In this connection, an appendage of my assignment as Branch Chief is that of Chairman, Technical Provisions Committee. On this Committee are represented all government agencies interested in the supply of food. Its purpose is to initiate or revise federal specifications. The military utilizes two types of specification, both of which serve a single purpose—to provide a clear and accurate description of the technical requirements to the bidder; and a standard for inspection. We utilize the federal specification wherever possible or practica-

ble, but federal specifications are not available for every item, as a federal specification is developed only after two or more federal agencies indicate a need therefor.

Military specifications are developed for one of two reasons: Either there is no federal specification for the item, or the federal specification is designed exclusively around domestic, commercial requirements and overlooks certain essential military characteristics which are prime requisites for the military use intended. Some of you may consider certain specifications far too rigid. A little reflection, however, will suggest the need for an established standard of good quality. That insures that the taxpayer will get his money's worth, the military will get good food, and a minimum of misunderstanding will arise between the contracting office and the vendor. The specification further prevents substandard producers from successfully underbidding and delivering inferior products.

(2) *Stock Numbers* are included on the Procurement Request to specifically identify the item, the can size, the grade and type desired. This stock number is taken from the new Federal Stock Catalog.

(3) *Packing and Packaging Data* is furnished to indicate domestic or foreign use. Unfortunately, there are few domestic packed items that will withstand the rigors of oversea shipment and handling.

(4) *Delivery Schedules*—time and place—prevent cross haul, back haul, and the continual necessity for making small emergency shipments to forestall out-of-stock, and back order conditions.

(5) *Citations of Funds* are listed and identified to be accurately associated with a particular contract for purposes of later accountability and recording. The military ration value is predicated on the value of the garrison ration. Whenever that value is exceeded, special approval must be obtained.

The above data is tabulated on the Procurement Request, and sent to Procurement Division, where it is transferred to a Procurement Directive. This document is sent to the appropriate procurement agency for invitation to bid, either formally or by negotiation. This is the phase with which you are most familiar.

When contractors make deliveries of annually packed canned fruits, vegetables and juices, our Branch reviews, registers and records data obtained from depot receiving reports; and directs the accountable depot to order shipment from the contractor's warehouse to appropriate receiving depot. Another very significant function at this stage is to distribute and issue the older stocks, and stocks showing symptoms of early deterioration, in advance of the latest deliveries received.

I mentioned two types of depots; actually depots are labeled according to the assigned mission or missions. For example, there are general depots and technical service depots, the basic difference being that the latter supplies only commodities and services belonging to a single technical service such as the QMC. There are accountable and storage depots; one accountable depot may coordinate the activities of a number of storage depots which receive, store and distribute. Then there are regional and filler depots. The regional mission signifies responsibility for supplying all Army stations and Air Force bases within a regional area. The regional mission may be in addition to the filler mission, if the depot is located strategically to a port of embarkation and its filler mission is to back up the port supplying stipulated oversea commands.

There are two other procurement phases in which you have a possible interest: Locally purchased items by the QM purchasing installation or the station; and items for commissary store stocks, obtained on a Purchase Notice Agreement, which is in another form of local purchase.

This Branch is also responsible for the activities of the Market Center System which furnishes all perishables for the armed forces.

You will note that until now the Navy and Marine Corps have been omitted from my discussion. The reason is that the Navy and Marines determine their own requirements for nonperishables and submit requests therefor directly to the Procurement Division, with stocks to be delivered to Navy and Marine facilities where they perform their own storage and distribution functions. These two services cite their own funds. Air Force is allied more closely to the Army by a separate agreement, under the provisions of which we perform for them many of the same services as for the Army. They give us their strengths and their funds and we compute requirements, include procurement requirements with our own, and store and distribute as requisitioned from Army depots.

The Principal Considerations in Effecting Quartermaster Corps Procurement

By Col. W. F. Durbin
Chief, Procurement Division, Office of the Quartermaster General, U. S. Army

The magnitude of the procurement program of the Army Quartermaster Corps is suggested by the fact that it is responsible for some 70,000 different items. That figure alone is an index to the complexity of modern war and to the variety of products essential to forearm the nation for defense. The scope of our procurement varies, naturally, with our military commitments, but the overriding aim of Army Quartermaster procurement remains constant: to make our Army the best fed, best clothed and best equipped in the world. This is not a prodigal gesture. It is based on a fact-facing and realistic concept of the dangers that beset the free world. This concept relies on superior firepower, equipment and quality in manpower to overcome the greater numbers any potential enemy might muster against us.

The well-spring of this concept, the creative faculty which can arm it with force in time of crisis, is the productive genius of America. We are continually striving in our military procurement to reduce to the absolute minimum the burden of defense on the nation's economy, the real source of our strength, and our efforts are directed toward converting the taxpayer's dollar into the very maximum for defense.

Backing up the American soldier—often at the end of a global supply line—is the procurement apparatus upon which not only his well-being but, to a great extent, his effectiveness in combat depends. Victory has a habit of going to those who "git there fustest with the mostest," to quote a sound military maxim. You don't tell a front-line soldier that he'll get his supplies later. You can't ask for a postponement in war. Our procurement operates under an uncompromising deadline. The supplies must be in the hands of the soldier in time. That is our primary responsibility. Further, we cannot wait until the circumstances of war generate demand for a particular item. The supplies must appear, almost automatically from the soldier's viewpoint, when they are needed. In brief, we must take all factors of a combat situation into account and anticipate the fighting man's needs.

As the first link in the chain of supply, procurement officers must consider a complex of factors: the tactical situation, over-all logistics, type of warfare, climate, etc., and—at the same time—the capacity of industry, "lead" time, the economics and pace of production, civilian needs, pertinent statutory requirements, plus the necessity for not only phasing military needs into production without causing serious dislocations in our economy but also for getting the most for the taxpayer's dollar.

Military procurement is hedged about with statutes and regulations.

We cannot go into the market and buy with the freedom of free enterprise. We are an agency of the government and our operations must be consonant with the national policy as expressed in legislative enactment. For that and for another cogent reason—the varying needs of our most important customer, the front-line soldier—the modus operandi of Army Quartermaster procurement is quite different from industry.

We cannot, for instance, award a contract for the purpose of subsidizing an infant or ailing industry, no matter how rewarding such action might be in the long run to the nation in terms of productive facilities fostered and preserved for the sudden demands of an emergency. Nor can we come to the rescue of vendors who find themselves in a deficit situation and are unable to fulfill their contracts. We cannot exploit a cheap market and fill our warehouses, buying on speculation, as it were, even though a price rise in the near future is a dead certainty. Our buying is governed by a hard and fast rule. We are authorized to purchase only *required* supplies *as* and *when* they are needed, and as *economically* as possible.

Lead time is a crucial ingredient in the supply equation. In the procurement of canned fruits and vegetables, for instance, lead times run from 8 to 12 months. It is, as you may know, the interval between the time when the requirements for an item are computed to the time when it is delivered in quantity to the government. In addition to lead time, other important factors in the procurement equation are the productive capacity of industry; whether the item to be bought is the total production of the industry or a fraction thereof, the reputation of the particular industry for dependability; and whether the industry's operations alternate between high and low production. It is of mutual benefit to both industry and the government to have, where possible, military requirements phased into the valleys or low production periods of industry. We find it economical to so place our buying, whenever possible, and it exerts a stabilizing influence on industry. The military services are not what economists describe as a normal customer. Our requirements, which reflect the degree of the nation's military responsibilities, vary too much. During World War II Quartermaster purchases were tremendous. For instance, we bought more than 45 million tons of food and 123 million pairs of various types of footwear during World War II, to cite only two categories.

Our operations are by fiscal year. Therefore, the maximum a successful bidder can receive is one year's requirements. Furthermore, we cannot guarantee "repeat" business to any vendor. The award must go to the lowest qualified bidder, under the law.

In certain cases Quartermaster procurement can take up the slack in certain areas by buying from distressed industries or communities and its procurement policy also is designed to assist small business and broaden the industrial base of suppliers. Within the limitations of the law, we have done everything possible to place contracts with small business firms and in distressed areas.

Our product specifications do not necessarily match those of our suppliers, which sometimes reveal sectional differences. Our specifications must be national in application in order that we may be assured that every bidder is given an equal opportunity and of receiving a standard

Col. W. F. DURBIN

product. Competition and standardization are essential features of military supplies and highly important ones.

Although in commercial practice, a buyer sometimes goes to the aid of his supplier who is unable for financial reasons to fill an order, we are unable as a rule, under the law, to do so. Payment under a government contract cannot be made until title for the property has passed to the government.

The nature of the item must be considered in any procurement action. Is the item military or commercial? The C-ration is an example of a purely military item, and, of course, suppliers equipped to handle a large order for C-rations are necessarily limited in number. This is not true in the case of commercial items, like canned corn which is mass-produced by industry for a domestic and export market and is generally available.

The procurement of seasonal items like fruits and vegetables, for instance, must take into account Department of Agriculture forecasts on crop yields, and must be timed to coincide with the pack season. At the same time, procurement must be initiated for canned fruits and vegetables to compensate for shortages in the fresh products.

The war years made America familiar with the term "critical material." Such materials were often the bane of the procurement official's career during World War II. If a material—steel, for example—is in critical supply and cannot be obtained, a suitable substitute must be obtained. Beef was in short supply last fall, and substitutes were procured. Procurement officers faced a similar shortage in potatoes this spring.

To sum it all up, we try to do business in the manner common among business men within the latitude allowed us by laws and regulations, and we guarantee you that we will always strive to improve.

Estimated QMC Requirements from the 1953 Pack

Canned Fruits

Item	Thousands of pounds	Thousands of cases of 24/2½
Apples	15,830	406
Apple sauce	19,896	457
Apricots	11,554	257
Berries, all	7,076	163
Cherries, RSP	9,801	225
Cherries, sweet	2,803	64
Figs, Kadota	2,486	55
Fruit cocktail	14,715	327
Grapefruit segments	6,261	139
Juice, grapefruit	18,424	469
Juice, orange	22,158	492
Juice, blended	22,559	501
Juice, pineapple	26,073	579
Peaches	28,335	651
Pears	13,503	310
Pineapple, all types	20,857	463
Plums	4,540	101

Canned Vegetables

Item	Thousands of pounds	Thousands of cases of 24/2
Asparagus	8,674	304
Beans, lima	14,771	492
Beans, snap	38,963	1,367
Carrots	7,421	247
Catsup, tomato	27,526	834
Corn, cream style	11,825	394
Corn, whole kernel	30,517	1,017
Juice, tomato	39,190	1,370
Peas, green	28,225	941
Potatoes, sweet	36,089	1,357
Pumpkin	4,183	139
Puree, tomato	743	26
Sauerkraut	12,580	441
Spinach	2,712	100
Tomatoes	56,996	2,000
Tomato paste	12,440	380

FISHERY PRODUCTS CONFERENCE

What about Rising Imports?

By O. R. Strackbein, Chairman, The National Labor-Management Council on Foreign Trade Policy

In recent months a great wave of propaganda has carried to all parts of this country the new slogan "Trade, not Aid." This is a slogan imported from Britain where it was apparently coined by the Chancellor of the Exchequer, R. A. Butler. It was quickly seized upon on this side of the Atlantic by those who believe that we should reduce our tariff below its present levels so that imports would flow in more freely.

The purpose of the British and other Europeans is said to be payment to us in goods for the economic aid which they receive rather than accepting money grants indefinitely. This would relieve the American taxpayer from the subsidy of exports that he has borne during the entire postwar period.

The purpose of those in the United States who support the slogan is not to increase imports merely for the sake of increasing imports. While those engaged in the import business are, of course, interested in maintaining or increasing their import business, the export interests seek greater imports only as a means of maintaining or expanding their exports. If this could be accomplished without increasing imports, the export interests would not be found on the side of the importers.

Several arguments are used to impress upon the public the so-called logic of more and more imports. It is said over and over again that if we wish to sell abroad we must buy abroad. This is so obvious that no one can contest the force of the logic involved.

What is not said, what, indeed, is carefully avoided is any reference to the fact that we import now more heavily than ever before in our history. Our imports rose from $14 per capita in 1938 to $71 per capita in 1951. This represents a fivefold increase per capita, and while higher prices account for a good part of this increase, they do not account for all of it. Even if foreign wholesale prices rose 150 percent between 1938 and 1951, the fivefold increase in the dollar value of imports would still mean that the quantity (or physical volume) of imports had doubled. The quantity of British imports in the same period rose less than 30 percent, so that our record of buying abroad since before the war is better than that of the other leading import nation of the world.

This record in accepting goods from other countries is more than matched by our record in reducing our tariff barriers. During the five-year period 1931-35 our average duty on total *dutiable imports* was 50.02 percent. Today it is down to 12 percent. This is another way of saying that our tariff today is down approximately 75 percent from the level of 20 years ago. During the same period the duty collected on *total imports*, both dutiable and free, declined from an average of 18.45 percent to approximately 5 percent in 1951. In other words, our imports of nearly $11 billion in 1951 paid a duty of a little over $600 million.

None of the other leading trading nations of the world have a better record of effective tariff reductions than Uncle Sam, and perhaps none as good; and yet we are under persistent attack from abroad on the grounds that we maintain excessive tariff barriers.

But tariffs are not the only form of trade restriction. There are many others, such as import quotas, exchange control, import licensing systems, bilateral trading arrangements, and outright embargoes. Other countries have used and still use these restrictions to buttress their tariffs. By means of these various devices they virtually control the inward flow of trade. The United States, on the other hand, has resorted sparingly to such instrumentalities. Thus, whether we consider the tariff or other trade barriers, we find that the United States is a country of *low* rather than *high* trade barriers.

In the past our State Department has been at fault, either wilfully or through gross negligence, in its utter failure to publicize the facts just cited, and our newspapers and periodicals have been generally of little help. The result is that the people of this country are woefully uninformed or badly misinformed on the position of the United States in international trade and in the field of tariffs and trade restrictions. The time has come when this ignorance and its unfortunate results should be dispelled.

All this could be brushed aside as the result of carelessness or inaccuracy if the implications to American industry and labor were not so serious and if the failure to inform the public had not suited the purposes of the free trade advocates. It served the purpose of the State Department since the war not to enlighten the public; and now we find the "Trade, not Aid" propaganda following the old State Department line which called for progressive tariff reduction and movement toward free trade as rapidly as possible.

What, you may ask, is the serious aspect of this drive to reduce our tariff yet further? Would such action not result in narrowing the dollar gap or in eliminating it? Would it not thus lead to a restoration in the balance of world trade instead of continuing the present one-sided condition which finds us exporting more year after year than we import and thus subsidizing a share of our export trade? Would it not, indeed, permit our debtors abroad to pay their own way instead of continuing the present drain on our treasury?

It would be very foolish to deny that a very real problem exists; but before undertaking an answer to the foregoing questions it would be well to ask what is the nature and cause of the dollar gap and why it persists so stubbornly.

There need be no mystery about the origin of the gap. We could hardly have sent to our allies, as we did, the abnormal volume of postwar aid in the form of food, construction materials, textiles, machinery, rolling stock, fertilizer, medicinals, biologicals and much else without overbalancing the trading account. The dollar reserves of the war-exhausted nations were low and therefore wholly unequal to the burden. Their industrial plant was quite exhausted or destroyed; ours was not. We did not hold back our aid because of foreign inability to pay. We did extend some credits but our outright grants far outweighed the loans. Beside the humanitarian element present, there were political considerations.

At the same time it also fell to us to supply many other overseas markets that were previously supplied in great part by the other great exporting nations such as Britain, Germany, Japan, and France. This put a further strain on our productive capacity. For some time after the war we were the principal single source of supply for a great part of the world. Any wonder that our exports boomed and broke all previous records?

The war-torn countries had unusual and heavy needs after the war but had only broken factories and a crippled agriculture to produce for export. Obviously the dollar gap arose from visible and easily understood causes. Our own willingness to buy in return meant little or nothing as long as the export disability continued abroad. With recovery of foreign productive capacity, exports to the United States began returning to their prewar levels, as was to be expected. This movement would have arisen even at the tariff rates prevailing before the war. But during the war period additional substantial reductions were made. These reductions stimulated still further the efforts of foreign countries to export

to the United States. Certainly our tariffs, at these sharply reduced levels, did not act as a serious barrier to imports.

Our great postwar flood of exports was, of course, abnormal. It did not represent ordinary private international trade exclusively. As trade, a great part of it was wholly artificial and should have been treated as a delayed cost of the war, and was indeed so treated under the Marshall Plan.

But why has the dollar gap persisted after European recovery? And why not regard the need of continued aid as a continuing cost of military preparedness, which is what it is?

As overseas recovery gained headway after the war, a reversal of the tide of trade was to be expected. The war-shattered nations themselves would become less dependent upon us for supplies, equipment and commodities. At the same time the export trade of these countries would revive and they would begin to recoup their prewar markets. This would slacken the demand for our own exports.

This process was well under way when the Korean war broke out and the great defense spending of the present was launched. The trend of our postwar foreign trade has only to be examined for corroboration. The excess of our exports over imports had fallen from $8.6 billion in 1947 to $1.4 billion in 1950. *In fact, during several months in 1950 and early 1951 our imports exceeded our exports in value.* There can be little question that the dollar gap was on its way out when the Korean outbreak again upset the flow of normal international trade. The gap again widened and from the narrow width it had reached in 1950 it broadened out to $4 to $5 billion in 1951 and 1952.

Why then all the excitement about the revival of the dollar gap? The conditions that caused it in the first place reappeared in lesser degree and the return of the gap was only natural. In other words there has been another wave of artificial exports from this country. Also, the diversion from civilian to military production in Europe has retarded the upward export trend of those countries and has delayed their recapture of their prewar markets elsewhere in the world.

The future of the dollar gap turns upon two principal possibilities: (1) The return of the world to its prewar trading pattern, or (2) the holding by the United States of her predominant position in the markets that fell to her during the war and which she was called upon to supply during the period of export-incapacity of Europe (including Britain) and Japan.

What is the outlook for these alternatives?

Having become entrenched in many of these other markets, in Latin America and elsewhere, our exporters naturally will try to hold their position. On the other hand, the export-dependent nations, having recovered from the war will seek, as they have been doing, to recover their accustomed markets. And they may succeed.

Trade statistics show that the war-crippled nations made great progress from 1947 to 1951 in regaining their prewar markets. Our share in these markets, of course, declined accordingly. But in many instances the war-torn countries had by the end of 1951 come only about halfway back to their position prior to the war. What further progress if any they made in 1952 is not yet fully known because of the lag of statistics. However, indications are that not much further progress was made.

O. R. STRACKBEIN

The pressure that is felt today through propaganda as expressed in the slogan "Trade, not Aid" reflects the struggle between the efforts of the war-crippled countries, on the one hand, to recapture their prewar markets, and our own exporters, on the other, to retain their windfall of the war. Failure of the war-battered nations to make their way fully against our exporters and the fear of the latter that they will, have combined to create the great pressure that we are witnessing today for the wider opening of our own market as a *substitute*. In effect our *export* interests seek to make good to Europe the markets that she lost by offering her a greater share in our own market. They are willing and even anxious to give away what does not belong to them.

The greater import competition that would thus be stimulated would, of course, not be expected to strike these export industries at home; it would strike others of our producers, generally the smaller among our industries, agriculture and fisheries. The mass-production giants among our industries, which are in the forefront of our exporting producers, thus feel free to advocate higher imports. They themselves would remain unharmed.

Assuming no further outbreak on the international front, it seems probable that the world will return in great part to the prewar trading pattern. This has been the ruling tendency in the past; and the re-equipment of many foreign plants with the assistance of our aid program should in fact sharpen the competitive edge of the newly recovered countries and improve their export position.

In terms of our own export trade this would foreshadow a shrinkage and with this shrinkage would come domestic unemployment. Should we in the meantime slash our tariff yet deeper and refuse to plug some of the holes already existing, we might awaken to find ourselves not only driven out in our windfall markets abroad but badly battered competitively at home. To the unemployment caused by the contraction of our foreign market to prewar patterns would be added the unemployment and layoffs produced by mounting imports. The combination would form a powerful force for depression.

Tariffs on Canned Fishery Products

Let us examine the plight of the fish canning industry at the present time in the light of our past international trade policy and the economic conditions of the world following the war.

(1) The trade agreements program has not stimulated the industry's exports.

(2) Our overseas aid failed to maintain the favorable position that some of our fishery products enjoyed in certain foreign markets before the war. Import restrictions of the types referred to above and in some cases increases in tariffs—as contrasted to our program of tariff reduction—have reduced and in some cases completely destroyed export markets enjoyed by some of our products before the war.

(3) United States tariff reductions have greatly increased imports of certain canned fishery products. Evidence of this can be found by examination of recent import statistics for canned tuna, bonito and salmon.

In addition certain other aspects of the tariff have troubled the fish canning industry. The tuna industry's experience with the escape clause, for example, casts a revealing light upon

the defects of this clause as a remedy against injury from imports.

The holes to be found in our present tariff structure and in the trade agreements negotiated under existing legislation have been well illustrated by the speed with which the Japanese learned that tuna canned in brine enjoys a much lower tariff rate than tuna canned in oil. Even though their exports of tuna canned in oil to this country had already reached record levels, surpassing her prewar shipments, the Japanese quickly shifted to production and export of tuna in brine. This shift, together with other influences, soon badly disrupted the tuna market in the United States.

The maintenance of an inflexible "free list" of items on which tariffs can only be imposed, regardless of changing conditions, by the slow process of legislation also complicates the situation. Such items as shrimp (fresh, frozen or canned), lobster, and tuna (fresh or frozen) are a few of the items on the free list.

We may now bring the problem previously posed down to concrete terms.

The catching and processing of tuna, as an example, while representing important investments in boats and plants and while affording employment to many fishermen, crewmen and canner workers, nonetheless does not rank as a large industry by American standards.

What Should U. S. Trade Policy Be?

The question is, should this industry, among many other smaller industries, be exposed to destructive competition from abroad so that our huge industries, such as automobile manufacturing, may have a better chance of holding foreign markets against recapture of their prewar trade by European countries? Shall our government as a matter of policy say that it is more important that the mass-production industries retain their commercial gains of the war abroad than that the domestic market be maintained for our smaller industries against destruction by import competition?

The answer, fortunately, need not be in terms of black or white. Foreign countries may be assured a reasonable share of our market without exposing our producers to destructive foreign competition. This can best be accomplished by the establishment of flexible import quotas. The volume of imports could then be held within limits and their most damaging effects eliminated. The principal damage from imports lies in the threat or actuality of ever-increasing imports gained at the expense of domestic producers by underselling.

With the elimination of this threat, imports could be guaranteed a liberal share of our market and yet be stripped of the power to disrupt the market. Since price-cutting would not lead to greater imports, there would not be a temptation to resort to this means of selling more.

Since the war, for example, Japan has enjoyed a higher share of a larger market for tuna in the United States than before the war. This share could be set aside for Japan while at the same time taking away from the imports the power to demoralize the market and the threat of eventually taking it over.

Thus the domestic tuna industry would be saved. Capital investments would again be encouraged and normal expansion could continue. Yet our export industries would not find their overseas customers deprived of dollar exchange because of rising trade barriers established by the United States.

Through the wider extension of this system, the dollar gap could be eliminated through an orderly participation in our market by imports. The danger to our economy which is so generally associated with competitive imports would be neutralized. No further reckless tariff reductions would be either necessary or desirable; and past mistakes in cutting down rates could be remedied without upsetting the countries that export to us.

As a practical matter, the remedy against excessive tariff cuts under the trade agreements program lies in action under the "escape clause." This clause is administered by the Tariff Commission. Experience with the escape clause has not been reassuring, as the tuna industry well knows, and as the salmon industry, with its difficulties from imports, can only contemplate with anxiety. In other words, "something must be done."

The propaganda line of "Trade, not Aid" usually comes to several conclusions as far as legislation or administrative action in the field of tariffs and trade is concerned. (1) The advocates of "Trade, not Aid" want lower tariffs; (2) they wish to see the escape clause and the "peril point" provisions repealed; (3) they seek passage of a customs simplification bill; and (4) they seek repeal of the "Buy American Act."

In other words, they want to travel further in the direction that we have followed since 1934 when the Trade Agreements Act was passed. The fact that we do not yet know how far we have already exposed ourselves by tariff reductions made during the prosperous war and postwar years, weighs very little with them.

The fact that we also do not know how successful the war-retarded nations will be in regaining their old markets, thus making a larger market here unnecessary in the event of their success, likewise seems to make no impression. But for producers who are on the firing line, so to speak, the prospects make a different impression and call for a change in the direction of trade and tariff policy.

What then is in the offing? There is no certainty, but a few observations can be made.

Administration of the escape clause needs improvement; and legislation will almost certainly be introduced to bring this about. The peril point provision almost certainly will be retained. Also the establishment of import quotas will undoubtedly receive serious and sympathetic consideration.

The Trade Agreements Act itself will probably be extended. If it is modified as indicated here, the fish canning industry could live with the program. While receiving no visible benefits from it, the industry would at least be freed of the present injury from imports and from the threat of more serious injury to come.

A Discussion of Fishery Problems

By The Honorable Thor C. Tollefson, Representative from Washington

It has been my privilege, since coming to Congress, to attend all of the Conventions of the National Canners Association; and I have appreciated doing so because of the great amount of valuable information which a member of Congress is able to gather at them. Now Charlie Carry apparently believes that the time has come for me to pay for my education, and has asked me to give you some information concerning those problems of my Committee, the House Committee on Merchant Marine and Fisheries; and of Congress, which might be of interest to you. Since your particular group might be called the "fish section" of the N.C.A., I shall confine myself to fisheries matters, which are the subject of interest to the Fisheries Subcommittee of the House Committee on Merchant Marine and Fisheries, which I head.

When we talk about fisheries matters, we talk not only about a large industry, but also about one of our great natural resources. And while the industry aspects are important and numerous, we must at all times be aware of the fact that a constant supply of fish is necessary for the industry to operate and exist. If the fish supply disappears or decreases the industry is, of course, directly affected. In other words, no fish—no industry.

Our Committee is interested in the welfare of the industry and of necessity in conserving the resource. The fisheries resources are not inexhaustible. Witness the case of the Cali-

fornia sardine. Two years ago the pack amounted to 5 million cases. Last year it fell to a meager 75 thousand cases. The fish supply just disappeared. Where—no one seems to know. A lot of jobs both on shore and offshore are affected. So were the profits of the canners. More important still is the disappearance of a food resource.

Perhaps the sardine will come back. We hope so. But we can't sit idly by to find out. Some investigation and research must be done. I realize that some research is already being done. But it is my feeling our Committee should make certain that every angle is explored. Was the disappearance the result of natural causes? Was it the result of overfishing? Can anything be done to restore the runs? We must find out. Many jobs and much food is at stake.

The shad of the Chesapeake, which has been one of the greatest fishing waters of our nation, is a good illustration of the fact that fish runs may be depleted. In some areas of the Chesapeake, shad runs have been depleted as much as 70 percent to 80 percent, according to Maryland State Fisheries officials.

There is the problem of the Alaskan salmon fisheries. During the years 1930 to 1943 inclusive, the total catch ranged from 73 million to 129 million fish. The annual pack never ran below 5 million cases. In 1936, the peak year, the pack amounted to 8.4 million cases.

During the years 1944 to 1952 the catch ranged from 45 million to 78 million fish. The annual pack was always less than 5 million cases. In 1950, for instance, it amounted to 3.3 million cases.

What caused the reduction in the catch and in the resulting pack? There were undoubtedly a variety of factors. During the war years there was an intensified operation in the taking of fish. Our government was interested in increasing the supply of protein foods for ourselves and our allies. Salmon was an easy food to obtain, can and distribute. Perhaps we fished too intensely. During that same period the Fish and Wildlife Service lost some of its trained personnel, either to other agencies of government or to private industry. The Service could not police its regulations as well, or carry out its programs as effectively. After the war the number of fishing vessels increased. Perhaps the escapement for spawning purposes was not large enough. Strangely enough, conservation practices themselves, in some years, may have contributed to the smaller packs. By its regulations, the Fish and Wildlife permitted greater escapement for spawning purposes, leaving fewer fish to be caught.

The salmon fishery is a dynamic resource. Conditions and factors change rapidly. All segments of the industry—the man who catches the fish and the canner, the Fish and Wildlife Service, and yes, the Congress itself—must be on their toes constantly to preserve the resource and to keep the industry healthy. A constant program of research and study is necessary. Thousands of jobs hinge upon the preservation of the salmon resource; many millions of dollars are involved. Certainly the National Canners Association is interested. It is of more than passing interest to know that for many years the greatest source of revenue for the Territory of Alaska was the salmon fisheries.

Constant attention, study and research with respect to conservation of fisheries will pay dividends. Witness the halibut fishery of the North Pacific. The halibut fishery a number of years ago seemed to face practical extinction. It had become greatly depleted—depleted to a point where it was not, from a practical business standpoint, profitable to go fishing. Now, as the result of a program of research and regulation jointly engaged in by the U. S. and Canada, the halibut fishery has been restored. The taking of halibut is once again a profitable operation, providing jobs and profits. The work of the International Fisheries Commission of the U. S. and Canadian governments has paid dividends in jobs, profits *and* food resources.

Rep. THOR C. TOLLEFSON

A similar experience has been had with the Sockeye salmon, which used to be a large fishery. This specie of salmon spawned in the upper reaches of the Fraser River in Canada. Rock slides and road construction work obstructed the river and the fish were unable to reach their spawning areas. Over a period of time the fish runs almost disappeared. An international arrangement was entered into by U. S. and Canada. Through the joint efforts of these countries, the Sockeye salmon is on its way back. In a relatively few years time, this fishery will in large measure be restored. Another source of food will be available with its attendant jobs.

Many of you are familiar with the splendid work that has been done with the North Pacific seal. Whereas this resource was once practically depleted, it is now in a flourishing condition. The taking of fur seals under government supervision and regulation is now a million-dollar industry.

It might be of some interest to you to know that our government is in the process of preparing and negotiating a fur seal treaty with Canada, Japan, and Russia. A conference, to which those three nations have been invited, will be held this summer for the purpose of endeavoring to consummate such a treaty. This fishery, if it may so be called, is considered to be of sufficient importance and magnitude to warrant dealing with the nation that is causing us a lot of trouble in Korea.

As a consequence of fishery depletion, our fishermen have had to go farther and farther away from our own shores to catch certain species of fish. That has been true with respect to the fishermen who have operated along almost the entire coastline of the U. S. The New England fisherman travels several days' journey from his home shores. So does the tuna fisherman of the Pacific Coast states, and the shrimp fisherman in the Gulf. Fishermen of other nations also fish in distant waters, far beyond the three-mile limit. They compete with our own fishermen for the same fishery resource. This situation has given rise to problems which did not exist in bygone years. International problems have arisen that call for the help and services of the federal government. For the North Atlantic area there is an International Commission for the Northwest Atlantic Fisheries, composed of representatives from several Atlantic nations.

Our government has also been compelled to negotiate on fishery problems with Mexico, Canada, Japan, Central and South American countries, and with others. In the Gulf of Mexico several of our shrimp boats have been seized by the Mexican Government, necessitating diplomatic negotiations. Our State Department has had to negotiate with Mexico on other fishery problems as well.

I have already mentioned the halibut and salmon arrangements with Canada.

Just last year our State Department negotiated an agreement with Japan concerning Pacific fisheries. Now we are about to negotiate another

with respect to the seal. Russia, as I have indicated, may be a party to it.

One of the bases for international negotiations is the need for conserving fishery resources of the open seas. They could be depleted by overfishing and bad fishing practices just the same as those nearer our own shores. Regulation of the fisheries must be on an international level with all interested nations participating.

Another problem requiring study not only by our Committee, but by Congress as a whole, is that which has arisen as a consequence of the importation of great amounts of cheaply produced foreign fish. A few years ago, our Committee held some hearings on this subject and heard considerable testimony on the matter. Witnesses pointed out, for instance, that employment in certain New England fishery areas had dropped 50 percent because of these imports. Other witnesses predicted that some shore operations of the fishing industry would be forced out of business or would be compelled to move their operations to Canada. More recent information indicates that their predictions were to a considerable degree accurate.

Now we are informed that the domestic inventory of groundfish fillets is the largest in our history because of imports of foreign fish fillets. Domestic producers are concerned about the marketing of their products. Representatives of the fishermen themselves inform us that their livelihood is threatened. They want and expect Congress to do something to protect their jobs. They suggest tariffs and quotas on imports. They ask that our Reciprocal Trade Agreements be more truly reciprocal, to the end that domestic industry be accorded some consideration.

I say that Congress must give the problem consideration and study. Without question, the consumer has an interest in the matter. He wants his food costs to be as low as possible. On his side of the question is the desire for lower food prices. On the other side is the desire of fishermen for preservation of their jobs. Congress must balance one against the other and at the same time give thought to the possibility of relinquishing control of a valuable food resource to foreign countries. Incidentally, this particular food resource will become more and more important with passing years as our population increases.

A similar situation exists with respect to our tuna fishing industry. Increasing imports of foreign tuna are causing tremendous concern on the part of domestic industry. Last year a tariff on certain imports was sought. The House approved a bill providing for such a tariff. The Senate failed to act. The arguments pro and con were the same as those which had been advanced on earlier and similar occasions: Protection of American industry and jobs on the one hand, and lower food prices and the importance of foreign trade on the other. Congress will have to resolve it. Here, too, Congress must give consideration to the possibility of relinquishing control of a food resource to foreign countries.

An interesting situation from the standpoint of cannery employees is developing. Some of these employees have been opposed to a tariff because imports of foreign frozen tuna have assured them of more steady employment at their particular canneries. Now the Japanese, for instance, who are large exporters of frozen tuna, are beginning to do more of the processing of the tuna fish before exporting it. It is entirely conceivable that they will eventually do more of it. In the final analysis, it is possible that the only processing remaining to be done in the United States will be to place the product in the can. Then a canning operation here might require only a half-dozen employees where it now employs 50 or 60.

I have discussed in a very general way some of the fishing problems to which I believe our Committee will give consideration. These problems are in my estimation of some importance to our economy. Most certainly, they are important when considered as food resource matters.

Marketing Canned Fishery Products

By Harley V. McNamara, President, National Tea Co.

I had the pleasure of attempting to tell a fish story back in April of 1949, before the National Fisheries Institute. At that meeting I made some very provocative remarks and I never expected to be asked to talk to any group on fish again.

That meeting and this one have quite a bit in common in that the Committee on that occasion selected for their theme, "selling fish products in a competitor's market." I am sure you will all agree that we are back there again on most all food products, but on your line especially.

Mr. Carry suggested that the title for today's talk be "marketing canned fishery products," but said he felt the title to be somewhat colorless and arbitrary, and left it up to me to submit a better title. Not being clever enough to produce a more descriptive one, I decided to use the suggested one, and therefore, my remarks shall be kept as close to this subject as possible.

To go back to one of my most provocative remarks made in 1949, I hope you will bear with me for repeating it, because what I said at that time gave your industry at least a little pat on the back. With your permission I quote:

"I frankly believe that the fishing industry, as a whole, has not prepared to sell its product to the consumer. To me, it appears that the fishing industry was created by an act of God, and in most cases it still seems to be waiting for acts of God to help sell its product. Maybe I had better explain this remark. As I see it, the good Lord put the fish in the oceans, lakes and streams. Man first caught fish to help out his food supply. Then, because of seasonal conditions, he found how to keep fish from season to season. He then learned how to put fish in cans. Frankly, if it were not for the canning of fish, I am afraid the fish industry would have perished long ago. Canneries, particularly those canning tuna and salmon, in my opinion, have done a better job of merchandising canned fish than has the rest of the fishing industry in merchandising fresh or frozen fish up to now.

"The good Lord gave us religion. Religion, with its rules for fast and abstinence, has been the fish industry's best salesman to date. Let's stop depending on acts of God to help the fish industry. Let's get out and sell fish and sea foods to the consumer. Most everyone knows that fish is good food, nutritious food and economical food. Let's sell it as such. Let's create more acceptance for fish and fish products by better packaging, better quality, better displaying, and better selling methods. Maybe the industry should adopt as a slogan 'Every Day is Fish Day."

For your information, our sales and tonnage on frozen packaged seafoods have shown remarkable improvement and with further improvements in packaging and processing methods, our sales and tonnage should continue to improve. The frozen fish industries are now coming out with precooked fish fillets and many other precooked sea food varieties. I personally like the slogan one of them used the other day and that was, "It couldn't be fresher if we docked our boat at your door and just heat and eat." It is remarkable the way the frozen ready-to-eat products are taking hold—not only fish, but beef, veal and chicken. Complete meals are now available, packed on aluminum plates, ready to take home, throw in the oven and serve right on the table. Do the housewives like that? Just ask any of them. The only question is, "Does the 'old man' want to pay for the extra cost of doing this, rather than have his wife do all the work at home?" I am not going to try to give you the answer to this question, be-

cause it could lead to a lot of bloodshed, especially from my spouse.

Don't fight. Join them. Try to do something with your product to offset these ideas. I said previously the canned fish industry had done a good job, but now I am starting to wonder if they are sitting on their hands and trying to live on their past reputation.

I don't know when I've been more stumped in an attempt to be helpful to a part of our great food industries than I have been in trying to be constructively helpful to your industry in this little talk.

I asked our people here in Chicago to get me some figures on your business and ours, and "lo and behold" I found these rather startling. I sincerely hope you do too. Most all of my remarks will be based on our Chicago branch operation. I would like to tell you that on most products our other branches, pretty well, take the same trend as Chicago.

I am going to talk about both glass and canned fish. I don't know whether or not the glass fish, such as herring and shrimp, are in the canned category, but to me fish is fish—no matter what form—and if canned and frozen fish sales are off, maybe some other product is taking its place.

In the last half of 1948 and the first half of 1949—a 12-month period—frankly, I don't know why the figures were split in this manner, unless they were secured from our supplier that started serving us in July, 1948—we sold approximately 12,000 cases comprised of three varieties, each in two sizes. In the last half of 1949 and the first half of 1950—a 12-month period—we sold 19,500 cases. In the last half of 1950 and the first half of 1951, we sold 27,600 cases. The last half of 1951 and the first half of 1952 we sold 29,600, and at the rate we have been going since July, 1952, to February of this year, we should sell at least 40,000 cases for a 12-month period. I am not aware how this would stack up with other chains. I wouldn't know your own or the industry's figures, but I think it is a swell increase and has shown that we are making progress at least with this line.

In 1952 over 1951, we doubled our sale of shrimp in cocktail sauce, which sold from the same case as our pickled fish. The figures I gave you previously were for pickled fish only and did not include cocktail shrimp.

I know you are starting to wonder if I am ever going to get to your main products. I sure am and right now. Here's where I have a real surprise. Maybe you folks know about it. I surely didn't.

Do you know that in dollar value, we are selling $3 to $1 on red salmon against pink and, considering the price differential, we are actually selling 1½ cases of red salmon to one pink. This tells me that people are "trading up"—buying the better grades.

Another funny thing is that while we pride ourselves on not being a private label house and selling nationally advertised brands, we still have a few private labels carried over from the previous management, such as Natco red salmon, and we sell more of this brand than we do the two top nationally advertised brands that we handle. Our retail price is from 5 cents to 10 cents lower per can. This seems funny, after I told you that people are "trading up," but this is the truth. I believe the only answer we can give to this is that they have as much confidence in our label as they have on nationally advertised labels. Frankly, we won't compromise with quality under any of our own labels.

HARLEY V. McNAMARA

Statistics bore me and I suppose they bore you, too, but I have just a few more which I think may help our story by giving them to you.

We sold more than twice as many cases of Norwegian sardines as we did Maine—not because we wish to, but because the public buys them—and we sell more than twice as many Maine sardines as we do California sardines. I well remember when I was actually working in stores, No. 1 oval tomato sardines was our number one seller and the large can of mustard sardines was our number two seller. Have we allowed these two items to slip in reputation where they are only fit for animal instead of human consumption? If so, why? Or are the people trading up to that extent; and if so, what are you going to do about it? To the best of my knowledge, little if any foreign foods, other than sardines, outsell our American foods. Do you know that our anchovy sales alone are within $5,000 of all our California sardine sales?

The only bright spot I see in your picture is the tuna fish sales. I wish every item in our food line had shown the improvement that tuna has. I would like to give you these figures, but unfortunately, if I gave them to you, they would also be given to our competition, but let me tell you I had them rechecked twice, because I actually didn't believe them myself. Our vice president in charge of purchases vouches for these figures.

Our total dollar sale of tuna is in excess of the total sale of all salmon and sardines combined and our cheapest tuna outsells any other one brand of tuna. This contradicts what I have said about people "trading up."

Business Week in its February 4 issue, carried a story on fish, calling attention to the Boston port. It stated that in 1949 Boston Port handled 275,000,000 pounds of fish, but last year only 179,000,000 pounds—a loss of 96,000,000 pounds, or approximately a decrease of 33 percent. I thought maybe some other port had picked up this tonnage, but I am informed they have not. We actually had an increase in our over-all U. S. fish sales, but this comes from imports rather than the U. S. production. According to the statistics in the same story, the U. S. fish consumption is 11 pounds per capita, Great Britain 35 pounds per capita, and Japan 55 pounds per capita. It seems to me we are doing a very poor job of selling our fellow Americans our fish stories.

Frankly, I don't think we need any more fish. I think we need better ways to sell more canned fish, better advertising programs, better labeling, more and better ways to serve canned fish and better salesmanship on selling canned fish by all of us.

With all the outstanding brains we have in our advertising agencies throughout the country, it seems to me that they have done a very poor job of selling our American people on the necessity of sea food in the American diet.

In closing my little talk, I am closing with a question:

Recently the American people have been sold on chlorophyl. Chlorophyl in everything. If you don't use this or that with chlorophyl you will actually stink. That sweet young thing won't dance with you. Neighbors will shun you. Even your dog won't like you. Then why not campaign to sell the people that if they don't eat fish products, especially canned fish products, their bodies will start shrinking? Their brains will dry up; in fact their offsprings will slip back where they were supposed to have started from—monkeys. "Sensational," you answer. This leaves me closing by tossing the ball back to you fish peddlers.

N.C.A. OFFICERS AND DIRECTORS

Louis Ratzesberger, Jr., 1953 President of N.C.A.; E. E. Willkie Elected Vice President

Louis Ratzesberger, Jr., president of the Illinois Canning Co., Hoopeston, Ill., was elected 1953 President of the National Canners Association.

He succeeds Fred C. Heinz, vice president of the H. J. Heinz Co., Pittsburgh.

E. E. Willkie, president of Pacific American Fisheries, Inc., Bellingham, Wash., was elected 1953 Vice President of N.C.A.

Carlos Campbell of Washington, D. C., continues as Secretary-Treasurer.

The N.C.A. membership elected 25 Directors to new terms and named 3 to unexpired terms; the terms of 44 members of the Board of Directors were held over.

Mr. Ratzesberger has been active during postwar years in numerous N.C.A. activities. He has served on the Association's War Mobilization Committee, the Board of Directors, 1946-48, and on the Statistics Committee and the Labeling Committee.

Mr. Willkie has had wide experience in association work. He was president of the Evaporated Milk Association, 1945 and 1946. Since 1945 he has served on many N.C.A. Committees—Resolutions, Fishery Products, Public Relations, Home Economics, and War Mobilization. He served as an N.C.A. Director, 1949-52, and has been a member of the Administrative Council since 1949.

N.C.A. Board of Directors

Directors Elected to Fill Unexpired Terms

William E. Butterfield, Butterfield Canning Co., Muncie, Ind.

George Davison, Foster Canning, Inc., Napoleon, Ohio

Samuel E. W. Friel, S. E. W. Friel, Queenstown, Md.

Directors Elected for Three-Year Terms

Joseph F. Barker, The Utah Canning Co., Ogden, Utah

C. F. Burhans, Jr., Lakeland Highlands Canning Co., Inc., Highlands City, Fla.

Fred C. Bush, Bush Brothers & Co., Dandridge, Tenn.

Hamilton C. Davis, Walnut Creek Canning Co., Walnut Creek, Calif.

John E. Dodds, Schuckl & Co., Inc., Sunnyvale, Calif.

John E. Frost, Delta Canning Co., Inc., Raymondville, Texas

J. William Hathaway, Hathaway Bros., Columbia Falls, Me.

Karl A. Hirzel, Hirzel Canning Co., Toledo, Ohio

Marvin H. Keil, Green Giant Co., Beaver Dam, Wis.

Ralph Keller, George A. Hormel & Co., Chicago, Ill.

Walter J. Kemp, Kemp Bros. Packing Co., Inc., Frankfort, Ind.

Charles O. Koller, Charles G. Summers, Jr., Inc., New Freedom, Pa.

Edwin C. Kraus, Big Stone Canning Co., Ortonville, Minn.

Elton Lasselle, Portland Canning Co., Inc., Sherwood, Ore.

J. G. McIntosh, Baldwin Packers, Ltd., Lahaina, Maui, T. H.

F. J. McQuad, John W. Taylor Packing Co., Inc., Hallwood, Va.

W. Ennis Parker, Pomona Products Co., Griffin, Ga.

A. J. Rogers, Cherry Growers, Inc., Traverse City, Mich.

Richard Schlecht, Rossville Packing Co., Rossville, Ill.

George C. Seybolt, Wm. Underwood Co., Watertown, Mass.

G. Bartol Silver, Charles B. Silver & Son, Havre de Grace, Md.

Vance F. Sutter, Fidalgo Island Packing Co., Seattle, Wash.

Donald E. Tobin, Victor Preserving Co., Ontario, N. Y.

Marcus Urann, National Cranberry Association, South Hanson, Mass.

Fred T. Wright, Beaver Valley Canning Co., Grimes, Iowa

Directors Whose Terms Held Over

Frank Armstrong, Jr., National Fruit Product Co., Inc., Winchester, Va.

Charles H. Bailey, Monmouth Canning Co., Portland, Me.

A. Edward Brown, Michigan Fruit Canners, Inc., Benton Harbor, Mich.

N. C. Buckles, Quality Food Products Co., Bradford, Ohio

J. Glen Brubaker, Hemet Packing Co., Hemet, Calif.

R. D. Cleaveland, The H. J. McGrath Co., Baltimore, Md.

Mrs. M. F. Counter, The Fort Lupton Canning Co., Fort Lupton, Colo.

Berkeley A. Davis, Rogers Canning Co., Milton, Ore.

George H. Draper, III, Draper Brothers, Frederica, Del.

Edward R. Elwell, Burnham & Morrill Co., Portland, Me.

A. M. Erickson, Barron-Gray Packing Co. Div., Hawaiian Pineapple Co., Ltd., San Jose, Calif.

S. K. Ferguson, Lakeside Packing Co., Manitowoc, Wis.

Robert A. Friend, Friend Bros., Inc., Melrose, Mass.

Leo M. Gleason, G & M Food Products, Des Moines, Iowa

George Gooding, California Packing Corp., San Francisco, Calif.

Robert A. Harris, Jr., Kinsale Canning Co., Kinsale, Va.

Henry W. Hartle, Owatonna Canning Co., Owatonna, Minn.

J. D. Hendrickson, Columbia River Packers Assn., Astoria, Ore.

T. B. Holcombe, Indian Ridge Canning Co., Inc., Houma, La.

Grant Horsey, Wm. J. Horsey Co., Tampa, Fla.

Grover Howard, Baron Canning Co., Westville, Okla.

Bradley T. Jones, Pictsweet Foods Inc., Mt. Vernon, Wash.

Spencer R. Keare, Illinois Canning Co., Hoopeston, Ill.

M. E. Knouse, Knouse Foods Coop., Inc., Peach Glen, Pa.

George Lambert, Keystone Mushroom Co., Inc., Coatesville, Pa.

R. C. Lewis, Bordo Products Co., Winter Haven, Fla.

W. Stanley Macklem, Curtice Brothers Co., Rochester, N. Y.

Philip N. Mark, Tri-Valley Packing Assn., San Francisco, Calif.

A. N. Meyer, Fredonia Canned Foods, Inc., Fredonia, Wis.

Ivan Moorhouse, Olympia Canning Co., Olympia, Wash.

George Pierce, Fairmont Foods, Inc., Barker, N. Y.

Reynold H. Peterson, Big Horn Canning Co., Cowley, Wyo.

D. T. Saxby, California Packing Corp., San Francisco, Calif.

Robert E. Searby, Hawaiian Canneries Co., Kapaa, Kauai, T. H.

L. E. Shannon, Otoe Food Products Co., Nebraska City, Nebr.

P. K. Shoemaker, H. J. Heinz Co., Pittsburgh, Pa.

Victor R. Smith, Box Elder Packing Corp., Brigham City, Utah

Angus G. Stevens, Stevens Canning Co., Ogden, Utah

Alfred J. Stokely, Stokely-Van Camp, Inc., Indianapolis, Ind.

A. O. Verbeke, Libby, McNeill & Libby, Chicago, Ill.

Albert Vignolo, Jr., West Coast Packing Corp., Long Beach, Calif.

F. H. Walrond, Manteca Canning Co., Manteca, Calif.

Newlin B. Watson, R. S. Watson & Son, Greenwich, N. J.

D. B. Wood, Wood Canning Co., Stockton, Calif.

1953 Finance Committee

The personnel of the Finance Committee was approved at the General Session. As announced by President Ratzesberger, it is as follows:

Fred C. Heinz, H. J. Heinz, Co., Pittsburgh, Pa., *Chairman*

H. J. Barnes, Kaysville Canning Corp., Kaysville, Utah

John L. Baxter, H. C. Baxter & Bro., Brunswick, Me.

E. B. Cosgrove, Green Giant Co., Le Sueur, Minn.

Howard T. Cumming, Curtice Brothers Co., Rochester, N. Y.

S. B. Cutright, Illinois Canning Co., Hoopeston, Ill.

Clinton W. Davis, Portland Packing Co., Portland, Me.

Ralph O. Dulany, John H. Dulany & Son, Inc., Fruitland, Md.

A. T. Flynn, Reid Murdoch Div., Consolidated Food Processors, Inc., Chicago, Ill.

William A. Free, Hungerford Packing Co., Hungerford, Pa.

Walter L. Graefe, Pomona Products Co., Griffin, Ga.

G. Sherwin Haxton, Haxton Foods, Inc., Oakfield, N. Y.

W. U. Hudson, Gerber Products Co., Oakland, Calif.

Harold J. Humphrey, Birds Eye Division, General Foods Corp., New York, N. Y.

Marc C. Hutchinson, Michigan Fruit Canners, Inc., Fennville, Mich.

Adolph C. Ketzler, Bordo Products Co., Chicago, Ill.

H. F. Krimendahl, Stokely-Van Camp, Inc., Indianapolis, Ind.

D. P. Loker, French Sardine Co., Terminal Island, Calif.

R. G. Lucks, California Packing Corp., San Francisco, Calif.

John F. McGovern, Green Giant Co., Le Sueur, Minn.

George B. Morrill, Jr., Burnham & Morrill Co., Portland, Me.

Fred M. Moss, Idaho Canning Co., Payette, Idaho

Maxwell N. Naas, The Naas Corp. of Indiana, Portland, Ind.

Art Oppenheimer, Marshall Canning Div., Consolidated Food Processors, Inc., Marshalltown, Iowa

Robert C. Paulus, Paulus Bros. Packing Co., Salem, Ore.

E. N. Richmond, Richmond-Chase Co., San Jose, Calif.

Emil Rutz, Schuckl & Co., Inc., Sunnyvale, Calif.

R. L. Smith, Kuner-Empson Co., Brighton, Colo.

Henry P. Taylor, Taylor & Caldwell, Inc., Walkerton, Va.

A. O. Verbeke, Libby, McNeill & Libby, Chicago, Ill.

H. L. Wederts, Lakeside Packing Co., Manitowoc, Wis.

J. B. Weix, Oconomowoc Canning Co., Oconomowoc, Wis.

Oliver G. Willits, Campbell Soup Co., Camden, N. J.

E. B. Woodworth, Hawaiian Pineapple Co., Ltd., San Francisco, Calif.

Officers Elected by Other Associations

Officers of other trade associations, elected at their annual meetings during the Convention period, are:

Canning Machinery & Supplies Association

President—Hal W. Johnston, Stecher-Traung Lithograph Corp., Rochester, N. Y. (reelected); vice president—E. N. Funkhouser, Dewey and Almy Chemical Corp., Cambridge, Mass. (reelected); secretary-treasurer—W. D. Lewis, Battle Creek, Mich. (reelected); ex officio—J. C. Whetzel, U. S. Steel Company, Pittsburgh (reelected).

National Food Brokers Association

National chairman—E. Norton Reusswig, Lestrade Bros., New York; first vice chairman—Willis Johnson, Jr., Willis Johnson & Co., Little Rock; second vice chairman—George T. Neilson, A. H. Morse Co., Boston; third vice chairman—Truman Graves, Graves-Chambers Co., Seattle; treasurer—Harry E. Cook, Harry B. Cook Company, Baltimore (reelected); member-at-large—A. Earle Clark, Jr., A. Earle Clark & Son, Miami; president—Watson Rogers, Washington, D. C. (reelected).

National-American Wholesale Grocers Association

President—French Fox, Fox Grocery Co., Charleroi, Pa. (reelected); vice presidents—Stacey H. Gifford, Consolidated Grocers Corp., Chicago; J. G. Frey, Frey and Son, Baltimore; F. P. St. Peter, Carpenter Cook Co., Menominee, Mich.; Robert L. Montgomery, William Montgomery Co., Philadelphia; and Allen Klauber, Klauber-Wangenhein Co., San Diego; chairman of the board—Sherwin A. Hill, Lee & Cady, Detroit (reelected); treasurer—J. Stanley Seeman, Seeman Bros., Inc., New York (reelected); executive vice president—M. L. Toulme, New York (reelected).

Young Guard Society

President—George A. Schanbacher, H. S. Crocker Co., Inc., Chicago; first vice president—Reid W. Jensen, Varney Canning Co., Roy, Utah; second vice president—Robert Eirich, H. S. Crocker Co., Inc., Baltimore; secretary—Herb Shek, H. S. Crocker Co., Inc., Baltimore; treasurer—Robert W. Mairs, Winter Garden Citrus Products Coop., Winter Garden, Fla. (reelected).

Old Guard Society

President—Harry R. Stansbury, A. K. Robins & Co., Inc., Baltimore; first vice president—Ogden Sells, San Jose, Calif. (reelected); second vice president—William N. Campbell, The Fayette Canning Co., Washington C. H., Ohio; secretary—John Dingee, Crown Can Co., Philadelphia (reelected).

The Forty Niners

President—Robert A. Sindall, Jr., A. K. Robins & Co., Inc., Baltimore (reelected); vice president—Mel Carlson, Food Packer, Chicago (reelected); secretary-treasurer—M. R. Feeney, Lansing B. Warner, Inc., Chicago (reelected).

Association of Canners State and Regional Secretaries

President—Paul Hinkle, Ohio Canners Association, Celina, Ohio; vice president—Edwin W. Elmer, Minnesota Canners Association, Minneapolis; secretary-treasurer — C. Walt York, Pennsylvania Canners Association, York, Pa.

Associated Independent Canners, Inc.

President—John P. Kraemer, Mammoth Spring Canning Co., Sussex, Wis.; vice presidents—T. A. Freming, Fairmont Canning Co., Fairmont, Minn.; G. Bartol Silver, Charles B. Silver & Son, Havre de Grace, Md.; and Ed H. Dunlap, Plymouth Canning Co., Plymouth, Ind.; secretary-treasurer—G. E. Jones, Columbia Canning Co., Cambria, Wis. (reelected); assistant secretary-treasurer—Harvey R. Burr, Madison, Wis. (reelected).

1954 Convention

The 1954 Convention will be held in Atlantic City the third week in January, the official opening date to be decided.

The three principal associations—National Canners Association, National Food Brokers Association, and Canning Machinery & Supplies Association—will jointly sponsor the Convention and will assume responsibility for making arrangements for the attendance of other groups.

CONVENTION RESOLUTIONS

Immediate enactment of legislation restoring authority for compulsory inspection of food processing plants by the Food and Drug Administration was endorsed by the National Canners Association at its 46th Annual Convention.

The resolution was among those reported by the N.C.A. Resolutions Committee. The report was presented by Chairman Howard T. Cumming, who read the full text of the resolutions. They were unanimously voted and approved.

Government Procurement

Effective government procurement of canned foods—on which our armed forces are so vitally dependent—should be grounded on governmental recognition of certain principles. An equitable sharing of the responsibility for military supply among all members of the industry is a desirable element of a fair program. Procurement procedures should be impressed with the principle of maximum conformity to the commercial buying and selling practices normally prevailing in the industry. There should be equal and non-conflicting application of the national labor laws to both civil and military production. All procurement procedures should embrace a consistency of pattern and a continuity of operation sufficient to permit a ready transition to periods of greater or lesser military need. Legislative enactments and administrative regulations which fail to accord full recognition to these principles constitute impediments to the efficient fulfillment by the canning industry of its manifest obligation to the defense needs of the nation.

Factory Inspection

The canning industry approves of the immediate enactment of legislation restoring the authority to enter processing factories for the purpose of making the limited inspection authorized by the Federal Food, Drug, and Cosmetic Act.

President Heinz

To the office of President of this Association each man brings his own unique qualities. In Fred C. Heinz the gifts of leadership have been singularly broad and characterized by the warmth of his ever genial personality, his constant zeal in performance, and his genuine interest in the problems of the individual canner and staff member. Under his alert and knowledgeable guidance the public relations of the industry have been brought to new levels of effectiveness. The solid achievement of his tenure as President has always been attended by his sensitive courtesy and his graciousness in sagely directing the affairs of the Association. To Fred C. Heinz the canning industry remains greatly indebted.

Staff

The varied and valuable services offered the canning industry by the National Canners Association are a result of the zeal and painstaking effort of Carlos Campbell and his staff. For the outstanding manner in which they perform their many and difficult assignments the industry is ever grateful and expresses its sincere appreciation.

Past President Carroll Lindsey

The untimely death of Carroll Lindsey reminds the many who sought and secured his sage guidance during the wartime production battles that the home front also takes its toll. His executive skill and commanding wisdom in dealing with others, derived in pioneering the canning industry in his own state, fortunately were available to the canners of the nation in time of stress. These wartime contributions alone suffice as an enduring monument to his achievements. Yet for most the deeper grief lies in the loss of a modest friend who gave so freely of himself, ever unsparingly yet always willingly, to yield strength to his fellow men.

Past President Frank Gerber

In mourning the passing of Frank Gerber, in sadness and poignant sorrow, one may still rejoice in the truly good and full life he lived. Though he is best known and will be long remembered for having by his genius enlightened the tasks of mothers and fostered the health of children, those who were privileged to have him as a business associate and to share him as a friend can treasure many other warm memories. No man contributed more to the building of this Association and the development of the industry. In trouble he was steadfast, in effort constant and tireless, and in all things ever kind and genial. The inspiration he always afforded will be affectionately and long remembered.

Necrology

Leadership in this industry renews itself always from the inspiration of those whom each passing year inexorably takes from our midst. Yet however deep our grief in the annual roll call of those who have passed, the memory of their friendly fellowship sustains us in our sorrow and lightens our bereavement. During the last year there were taken from our councils these men and women with whose families and friends we join in mourning:

Dr. E. C. Auchter
H. L. Aukerman
Frank M. Ball
R. A. Burns
William F. Christel
A. E. Coddington
Dr. Fred F. Fitzgerald
Victor A. Friend
S. G. Gorsline
Frank Hamachek, Jr.
Col. Isaac Miller Hamilton
Prince E. Harris
William Kinnaird
Ralph Polk, Sr.
Ole Salthe
John W. Steinhart
Mrs. Edna Sheldon Trego
Norman L. Waggoner
W. Grason Winterbottom
F. Hall Wrightson

Guest Speakers and Allied Trades

The success of a National Canners Association Convention depends upon the hard work and cooperative spirit of many diversified elements. Our guest speakers, the allied industries, newspapers, radio and the trade press, all in their own way have contributed to the success of the 1953 Convention. The Association is sincerely appreciative for all that they have done and directs the President and Board of Directors to convey its gratitude to each of them.

Call for 1953 Directory Copy

Questionnaire forms on which canners are asked to submit information for the compilation of the 1953 edition of the *Canners Directory* were mailed to all canners on February 25, and should be on canners' desks when they return from the Convention. These forms should be filled out and returned promptly to the N.C.A. in the self-addressed, postage-paid envelopes provided.

As in past editions, the 1953 *Canners Directory* will list the name and main office address of each canning firm, location of factories operated by each firm in each state, and the canned food products packed by each firm within each state. Canners are asked to list the states and the cities and towns in which their canning plants are located, and to identify their products according to instructions in the questionnaire.

MEETING OF N.C.A. DIRECTORS

The Board of Directors of the National Canners Association held its Convention meeting in Chicago, February 20, and took action—

Terminating the Buildings Committee, whose program is completed, and authorizing transfer of its unused funds to the Association's General Fund,

Continuing the Conference and Convention Committees as Special Committees,

Authorizing appointment of a Special Committee to investigate the possibilities of Association programs and activities that would increase the use of canned foods,

Authorizing appointment of a Special Committee to study the pattern of the relation of research activities to other activities of the Association,

Directing an increase of $50,000 in the Trust Indenture Fund by transfer of that amount from the General Fund,

Approving the recommendations of the Administrative Council for a 1953 budget of $1,117,605 and for continuing the current rate of N.C.A. dues,

Approving amendment of the bylaws changing the title of Secretary to that of Executive Secretary,

Approving the appointment of Dr. Ira Somers to be Assistant Director of the Western Branch Laboratory,

Creating as a Special Committee, a Procurement Committee to act for the Association in connection with all activities relating to the current program of military procurement of canned foods,

Creating as a Special Committee, a Committee on Chemical Additives Legislation to deal with problems arising out of proposed changes in the Federal Food, Drug and Cosmetic Act, relating to chemicals and other additives in foods, and

Providing for the handling of nonvoting memberships.

Walter L. Graefe, Chairman of the Legislative Committee, reported to the Board briefly on proposed organization of that Committee necessitated by the new administrative setup in Washington. Mr. Graefe was followed by Robert B. Heiney, of the staff, and Hamilton Carothers of N.C.A. Counsel, who summarized current legislative proposals such as those on chemical additives and factory inspection, and indicated certain subjects that may require industry action during the year, such as the possibility of marketing controls and price and profit investigations of processed agricultural commodities.

Chief Counsel H. Thomas Austern was asked to outline the current administrative and legislative developments concerning the Robinson-Patman Act. He said that despite all the legal confusion concerning its interpretation, there is good reason to believe that many American businessmen are in favor of the principles sought to be reflected in the Patman Act, and that few would care to see it repealed. On this basis, Mr. Austern suggested that while there might be amendments confirming the right to meet competition in good faith, any outright repeal or drastic modification of the statute was highly unlikely. Moreover, many believe that an astute, truly expert, and more realistic Federal Trade Commission could by sensible interpretation make it work. Finally, Mr. Austern suggested that because there will always remain considerable areas of uncertainty as to the propriety of numerous business practices, any interpretations that the Act has been violated should have only prospective effect through cease and desist orders, and that retrospective punishment through criminal penalty and treble damage suits should be eliminated.

Mr. Austern also reported that when present President Eisenhower fills the existing vacancy on the Federal Trade Commission, and another one which will occur next September, there will be a Republican majority.

John Baxter, Chairman of the N.C.A. Labeling Committee, reported to the Board the results of the recent survey of industry preference for a single label term where more than one alternate is permissible under FDA regulations.

The purpose of the survey was to bring about standardized use of terms to aid the consumer in her purchase of canned foods. The N.C.A. labeling manual will be revised to incorporate these industry preferences.

The Committee recommended, and the Board voted approval of industry standardization on the following terms:

Product and Page in Labeling Manual	Recommended Terms
Apricots (69)	Halves Quarters Sliced In (packing medium) Spiced With Added Flavoring Seasoned with Vinegar
Cherries (75)	Red Tart Red Sour Pitted Light Sweet Pitted Dark Sweet Pitted In (packing medium) Spiced With Added Flavoring Seasoned with Vinegar
Peaches (111)	Cling Freestone Halves Unpeeled Halves Quarters Sliced Diced In (packing medium) Spiced With Added Flavoring Seasoned with Vinegar
Pears (115)	Unpeeled Whole Halves Unpeeled Halves Quarters Sliced Diced In (packing medium) With Added Flavoring Seasoned with Vinegar

Product and Page in Labeling Manual	Recommended Terms
Green and Wax Beans (135)	Green Beans Wax Beans Whole Vertical Pack Whole Asparagus Style French Style Cut Short Cut
Sweet Corn (167)	Golden Sweet Corn White Sweet Corn Whole Kernel Cream Style
Field Corn (165)	Cream Style Whole Kernel
Peas, Blackeye (185)	Blackeye Peas
Peas, Dried (187)	Dried Early June Dried Sweet Spiced Flavoring Added
Peas, Succulent (189)	Early June Sweet With Added Spice Flavoring Added Traces of Alkalis Added
Tomatoes (219)	Trace of Calcium Salt(s) Added Spice Added Flavoring Added

Annual Reports

Copies of the *Secretary's Annual Report, 1952*, and the *Annual Report of the Research Laboratories, 1952*, have been mailed to the office of each member.

Catsup Standards Meeting

Manufacturers of catsup met at the Convention February 24 to consider the advisability of amending the standard of identity of tomato catsup to permit the use of corn syrup as an optional ingredient.

Several canners had opportunity during the 1952 season to make trial runs using corn syrup. Canners who are equipped to handle most of the ingredients in liquid form find it advantageous to have all of the sugar ingredients also in liquid form.

No objection to the use of corn syrup was expressed at the meeting. It was moved, seconded, and unanimously voted by the group to request the National Canners Association to act for the tomato catsup industry in requesting a public hearing to bring about this modification of the standard of identity of tomato catsup to permit the use of corn syrup as an optional ingredient.

N.C.A. Publicity Activities at the Convention

A Press Room was maintained by the staff of the Information Division of the N.C.A. on the fourth floor of The Conrad Hilton throughout the Convention for the use of some 70 newspaper, magazine, radio and TV representatives covering the event.

Copies of the 38 Convention speeches, summaries and statements were available there, along with eight special news releases written and issued during the proceedings. Photos and biographies of speakers and officers were issued also, and the Information staff assisted reporters with background information and in other ways. Much of this appeared in daily newspaper accounts and features in Chicago and elsewhere, as well as on radio and TV newscasts. Special mailings were made also to more than 100 publications throughout the country that did not have representatives in Chicago.

Press Conference and Newsreel

A press conference, attended by representatives of the Chicago dailies, the wire services, and some of the trade press, was arranged with Senator Taft in the N.C.A. headquarters suite just before his departure from the Convention. Answering reporters' questions, Senator Taft elaborated on points made in his Convention speech on budget and tax plans and foreign relations. Chicago dailies carried data discussed in the press conference, along with their coverage of his address. The press conference also was telecast and put on the Chicago TV newsreel for showing on Monday and Tuesday nights of Convention week. It included scenes of Senator Taft with 1952 President Fred C. Heinz and 1953 President Louis Ratzesberger, Jr.

Ratzesberger on Radio

President Ratzesberger was guest speaker on a special radio program over Chicago stations WMAQ and WMAQ-FM, on Monday evening, February 23. The program was a musical salute by "The Northerners" to the 46th Annual Convention of N.C.A., and was sponsored by The Northern Trust Company. In an interview midway of the program, Mr. Ratzesberger related facts about the Convention and about the public service values of the canning industry, in terms of its contribution to public health, welfare and feeding convenience, benefits to farmer and labor, size of its operation, and its economy to the consumer.

Chicago Tribune Supplement

On Monday of Convention week, the Chicago *Tribune* featured a special 8-page supplement in color devoted to canned foods and the Convention. A special distribution of the supplement was made to canners in their hotel rooms. Title of the supplement was "Canned Food—an Everyday Miracle." The lead article, by Mary Mead, was headed, "Everything Imaginable for Your Table—at Any Season of the Year!", and the inside pages were devoted to various aspects of the public service of the industry and its products. Much of the material was supplied by the Information Division and recipe material, educational material and food photos were submitted by the Home Economics Division.

The supplement carried special articles on canning history from Appert to date; a guide to common can sizes; story of the progress from field to container; typical canning operations; the good record on canned foods prices; the safety of foods in cans; the easy preparation of family fare; dietetic foods; special canned products; a section of Convention news including illustrations and biographies of the N.C.A. officers; the development of the metal container; the use of glass in food packing; a story on can openers; the military can sizes; and numerous other features.

A large part of the text and some of the illustrations were taken from *The Canning Industry*, the new publication issued last year by the Information Division.

Convention Publications

Several publications are prepared annually by the N.C.A. for distribution and use at the Annual Convention.

Among these this year were two directories. Room numbers of the brokers were not available until late Saturday, February 21, but on Friday a preliminary listing of hotel locations of members of N.C.A. and C.M.&S.A., along with buyers, press representatives and certain others, was published. On Sunday, February 22, the official *Convention Room Directory* (130 pages) was issued. This included all the listings contained in the preliminary issue, plus those of the members of N.F.B.A. and their non-canner principals. The directory also included locations and phone numbers of all the principal Chicago hotels and clubs, a map of downtown Chicago, floor plans of the exhibit locations, and phone numbers of the various information and registration centers. The directory was published by courtesy of the Chicago Convention Bureau. The editorial and production supervision of copy prepared by the three sponsor associations was carried out by the N.C.A. Information Division. Distribution was made Sunday directly to the Convention hotels.

The Information Division also produced the official N.C.A. *Convention Program*—24 pages giving agenda details of the several program sessions held by the Association, as well as daily hour-by-hour records of the principal events of the over-all Convention.

A *Handbook of Canned Food Statistics*, prepared by the N.C.A. Division of Statistics, also was made available to each of the canner firms attending the Convention. This publication furnished the supply and demand situation for major canned food packs; distribution of the annual pack by can sizes; January 1 canners' and distributors' stocks; retail and wholesale price indexes; farm prices; per capita consumption data; and other pertinent statistics important in the operation of a canning business.

The N.C.A. Research Laboratories also issued, for distribution at the Convention, a bulletin entitled *Dietetic Canned Foods*. Its purpose was to provide general background information about dietetic canned foods and their nutritional significance, to provide the medical profession, the public and the canning industry with specific data obtained on dietetic canned foods as the result of the nutrition studies, and to point out for canners and other interested parties some of the precautions necessary in the production and marketing of these foods.

Dr. Ira I. Somers Named Assistant Director of Lab

Appointment of Dr. Ira I. Somers as Assistant Director of the N.C.A. Western Branch Laboratory at Berkeley, Calif., was announced during the Convention. Dr. Somers' work with West Coast members on a wide variety of problems is well known. He has been identified with N.C.A. research for 11 years. His assignment as Assistant Director takes effect March 1.

Dr. Somers was born in 1916 at Garland, Utah. In his early years he assisted three brothers in running the farm for their widowed mother. He was graduated in 1936 from Utah State Agricultural College, at Logan, Utah, with a B.S. degree, having majored in plant physiology and with chemistry and bacteriology as a minor. During the summers he gained practical experience in five Utah canneries as head of the quality control staff of the Rocky Mountain Packing Corporation. Also, during school, he was an assistant in the USDA Plant Pathology Laboratory at Logan and was in charge of this unit during his senior year.

In 1942, Dr. Somers completed his work on a research fellowship for his Ph.D. degree from Rutgers University at New Brunswick, N. J., and in February that year joined the N.C.A. staff at San Francisco.

His first assignment there was a study on heat distribution in retorts and later he did the pioneering work on in-plant chlorination, and has worked on thermal engineering, chemistry, bacteriology, and sanitation problems. In 1943-44 he conducted two-day training courses for factory personnel covering the subjects of food processing and the operation of processing equipment. He was one of the contributors and editors of the book *Sanitation for the Food Preservation Industries* and is author of several articles in the scientific literature. Dr. Somers has just recently organized a special Technical Information Service in the Berkeley Laboratory for the use of N.C.A. members. He was active in the recent West Coast building program, representing the staff in the supervision of construction in Berkeley and the handling of details with the architects and the West Coast Building Subcommittee.

His experience in practical canning, and in the many phases of the Laboratory work fit him especially for the duties of Assistant Director.

O. Eugene Shostrom

News of the death on February 23 of O. Eugene Shostrom, 58, of the staff of the Northwest Branch of the National Canners Association, was received during the Convention. Death came from a heart attack following an operation.

In his passing the sea food canning industry of the Northwest and Alaska has lost a conscientious and able worker who had much to do with the improvement of the methods of production of canned sea foods and the product itself. He had been connected with N.C.A. work in the Northwest Branch for 33½ years.

Mr. Shostrom was born near Tacoma, Wash., on October 5, 1894, was graduated from the University of Washington, and served in World War I with the Army Engineers. In 1919, a few months after establishment of the Northwest Branch of N.C.A. in Seattle, he served as a sanitary inspector in the Alaskan salmon canneries. In the fall of that year he joined the laboratories of the Branch and served in its scientific work and inspection service continuously up to the time of his death.

With other members of the Northwest staff, he was associated in several lines of pioneering work, including vacuum in canned foods, composition and food value of canned salmon, iodine content of salmon, and effect of sulphur compounds in the canning of fruits and berries.

Mr. Shostrom also designed an instrument for determining the hardness of the bones in canned salmon, which in many cases has an important part in determining the species. He devised a method which has been used widely in the reconditioning of canned sea foods. For more than 20 years he was in charge of the sea food inspection laboratory of the Northwest Branch. During World War II, when at times 80 percent of the American canned salmon pack was set aside for use by the U. S. government, Mr. Shostrom and his associates worked closely on inspection of government purchases.

TABLE OF CONTENTS